TP 13715E

Port of Montreal Extranet Design

Prepared for
Transportation Development Centre
Safety and Security
Transport Canada

BCE
Emergis

December 2000

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Port of Montreal Extranet Design

by
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Integration Project Team

BCE
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Transport Canada Transports Canada

PUBLICATION DATA FORM

1. Transport Canada Publication No. TP 13715E	2. Project No. 9859	3. Recipient's Catalogue No.
4. Title and Subtitle Port of Montreal Extranet Design		5. Publication Date December 2000
		6. Performing Organization Document No.
7. Author(s) R. Leblanc, N. Lavallée, D. Bélanger, et al.		8. Transport Canada File No. ZCD2450-C-388
9. Performing Organization Name and Address BCE Emergis 1155 René Lévesque Blvd. West, 22nd Floor Montreal, Quebec H3B 4T3		10. PWGSC File No. XSD-0-00096 11. PWGSC or Transport Canada Contract No. T8200-9-9503/001/XSD
12. Sponsoring Agency Name and Address Transportation Development Centre (TDC) 800 René Lévesque Blvd. West Suite 600 Montreal, Quebec H3B 1X9		13. Type of Publication and Period Covered Final 14. Project Officer Ernst Radloff

15. Supplementary Notes (Funding programs, titles of related publications, etc.)

Co-sponsored by the Program of Energy Research and Development (PERD) and the Research and Development Management Board (RDMB)

16. Abstract

Based on a solution identified in a previous study to improve the efficiency and productivity of container movement through the Port of Montreal, this report details the design specifications of an Extranet for the Port community that will be used to develop and implement a full production system.

A four-step approach was used to develop and design these specifications:

- Review the GE Information Services study entitled *Port Community Extranet System Validation* (TP 13531E);
- Develop a list of prototype screens and validate them with nine different potential stakeholders;
- Design Extranet specifications based on the screens, business workflows, and constraint highlights as discussed with the stakeholders in step two;
- Review the final design with Port of Montreal IT group and obtain approval from TDC and the Steering Committee.

The report provides descriptions of the Extranet's infrastructure, functions, database, security, and service level agreement in sufficient detail to develop an application and implement a functional system.

This Extranet application, designed to adapt and evolve easily, is the next phase toward a fully integrated solution for container management at the Port of Montreal. It is recommended that the implementation pilot phase be executed with a limited group of carefully selected participants to fine-tune the solution for more general use.

17. Key Words Extranet, network, Port of Montreal, container management		18. Distribution Statement Limited number of copies available from the Transportation Development Centre		
19. Security Classification (of this publication) Unclassified	20. Security Classification (of this page) Unclassified	21. Declassification (date) —	22. No. of Pages xl, 258, apps	23. Price Shipping/ Handling

Transports Canada Transport Canada

FORMULE DE DONNÉES POUR PUBLICATION

1. Nº de la publication de Transports Canada TP 13715E	2. Nº de l'étude 9859	3. Nº de catalogue du destinataire
4. Titre et sous-titre Port of Montreal Extranet Design		5. Date de la publication Décembre 2000
		6. Nº de document de l'organisme exécutant
7. Auteur(s) R. Leblanc, N. Lavallée, D. Bélanger, et al.		8. Nº de dossier - Transports Canada ZCD2450-C-388
9. Nom et adresse de l'organisme exécutant BCE Emergis 1155, boul. René-Lévesque Ouest, 22e étage Montréal, Québec H3B 4T3		10. Nº de dossier – TPSGC XSD-0-00096
		11. Nº de contrat – TPSGC ou Transports Canada T8200-9-9503/001/XSD
12. Nom et adresse de l'organisme parrain Centre de développement des transports (CDT) 800, boul. René-Lévesque Ouest Bureau 600 Montréal (Québec) H3B 1X9		13. Genre de publication et période visée Final
		14. Agent de projet Ernst Radloff

15. Remarques additionnelles (programmes de financement, titres de publications connexes, etc.)

Coparrainé par le Programme de recherche et développement énergétiques (PRDE) et le Conseil de gestion en recherche et développement (CGRD)

16. Résumé

Ce rapport fait suite à une étude menée antérieurement, qui proposait une solution pour améliorer l'efficacité et la productivité des mouvements des conteneurs dans le port de Montréal. Il énonce les spécifications de conception d'un réseau Extranet destiné à la collectivité portuaire, qui devront guider le développement et l'implémentation d'un système pleinement opérationnel.

Les auteurs ont suivi une démarche en quatre étapes pour établir ces spécifications :

- examen du rapport de l'étude *Port Community Extranet System Validation* (TP 13531E), réalisée par GE Information Services Canada;
- élaboration d'une série d'écrans prototypes et validation de ceux-ci auprès de neuf intervenants qui seront potentiellement reliés au réseau;
- définition des spécifications de l'Extranet, à partir des écrans, des flux de travaux et des principales contraintes établies avec les intervenants à la deuxième étape;
- examen de la conception détaillée avec le groupe TI du Port de Montréal et obtention de l'approbation du CDT et du Comité directeur du projet.

Ce rapport présente les différents composants de l'Extranet (infrastructure, fonctions, base de données, sécurité, entente sur le niveau de service) de façon suffisamment détaillée pour permettre le développement et l'implémentation d'un système fonctionnel.

Cette application Extranet est conçue pour être adaptable et évolutive. Elle constitue un pas vers une solution pleinement intégrée pour la gestion des conteneurs dans le port de Montréal. Il est recommandé de limiter l'implémentation pilote à un petit groupe de participants triés sur le volet, de façon à mettre au point le système avant de l'étendre à un plus grand nombre d'utilisateurs.

17. Mots clés Extranet, réseau, Port de Montréal, gestion de conteneurs	18. Diffusion Le Centre de développement des transports dispose d'un nombre limité d'exemplaires.

19. Classification de sécurité (de cette publication) Non classifiée	20. Classification de sécurité (de cette page) Non classifiée	21. Déclassification (date) —	22. Nombre de pages xl, 258, ann.	23. Prix Port et manutention

CDT/TDC 79-005
Rev. 96

Canada

ACKNOWLEDGEMENTS

Thanks to all of the stakeholders within the Port of Montreal community and Transport Canada.

EXECUTIVE SUMMARY

Background

The Transportation Development Centre (TDC) and the Port of Montreal (POM) have joined forces on an intermodal technology project designed to improve the efficiency and productivity of container movement through the Port. The current emphasis is on the terminal-truck interface, although it will later be expanded to all modes of transport. The project is part of a larger program designed to achieve fully integrated electronic document interchange among the Port's trading partners and other stakeholders through the implementation of Internet-based technology.

In this context, TDC has awarded a contract to BCE Emergis for the detailed design specifications of an Extranet for the Port of Montreal community. The Extranet solution was identified in a previous study (TP 13531E) conducted by GE Information Services Canada for TDC. By taking advantage of the Internet's flexible electronic data exchange capabilities, the Extranet will enable EDI-capable Port stakeholders to communicate with non-EDI trading partners, using the Internet as a communication gateway. The Extranet system advocates the use of open architecture and "best-of-breed" software solutions.

The specifications found in this design outline of the Port of Montreal Extranet are sufficiently detailed to be used to develop and implement a full production system.

Scope, Approach and Methodology

Two committees were created to fulfill the mandate: the Steering committee, composed of executive personnel from the Port of Montreal, terminals in the Port, and a logistics company, which validated the orientation of the study and helped the Project Committee to identify key players from whom to obtain information and validate the business workflow process; and the Project committee, consisting of an expert in transportation systems technology from TDC and two members of POM's IT department and BCE Emergis's IT division.

A four-step approach was used to write the specifications for the Extranet:

- Review the previous study conducted by GE Information Services Canada based on a series of interviews with various Port stakeholders and finalize the scope of the project with TDC and POM.
- Develop a list of prototype screens for the final program and validate these screens by conducting several interviews with freight forwarders, Canada Customs, transport companies, terminals, shipping lines, and logistics companies. A total of nine different stakeholders were consulted to validate these screens, with some stakeholders meeting up to three times.
- Design the Extranet itself based on the finalized screens, business workflows, and constraint highlights established with the various stakeholders during our interviews.
- Review the final design with POM's IT group and obtain approval from TDC and the Steering Committee.

The objective of the Port of Montreal Extranet is to allow its members to improve their overall efficiency, especially in the area of gate congestion and truck-terminal interface. Key areas of improvement through implementation of the Extranet are:

1. Improved services to community members and potential end users;
2. Continuous container visibility to all members with appropriate user access;
3. Expanded community participating in the use of electronic commerce;
4. Reduced waiting times at the Terminal Gate;
5. Improved and efficient communication among all members;
6. Fewer data entry errors and paperwork inaccuracies.

From a management point of view, the scope of the project as well as milestones, resources, and budget allocation were established to meet these six objectives.

The report entitled *Port of Montreal Extranet Design* comprises five sections:

- **The Architecture section** describes the infrastructure aspects of the Extranet by presenting the various networks and components required to achieve functionality.

  It details, from a hardware and software perspective, the nature and particularities of the various components of the Extranet, and provides an estimate of the costs involved in building the Extranet according to the specifications described in this report.

- **The Application section** describes all functions required to allow involved stakeholders (shipping lines, terminals, freight forwarders, trucking companies, and various government ministries) to exchange information related to containers. It includes descriptions of screens, information to be supplied, controls to be performed, search functions, container status, batch transactions, alerts, archiving, and reports.

  This section contains sufficiently detailed information for each function and constraint (business rules) to enable the application to be developed. The cost of developing such an application is not included in the analysis and should be provided in response to a future Request for Proposal (RFP).

- **The Database section** describes the central database that holds and maintains all information related to containers. A detailed relational data model that comprises all objects, data elements, relations, lists of tables, and required fields, as well as a glossary of elements are included in this section.

- **The Security section** addresses the security design process for the Port of Montreal Extranet. Security is a recurring process for which there is no unique or perfect solution. In this context, guidelines and recommendations are provided in this section and a threat analysis of the Extranet is conducted to ensure the Extranet is secure at a reasonable cost.

- **The Operations / Service Level Agreement section** details the Service Level Agreement (SLA) Extranet community solution required by the Port of Montreal. The SLA outlines customer support services, the registration process, the escalation procedure, and operating policies. It also defines the nature of the relationship between the Extranet provider and its members, including the roles and responsibilities of each of the participants (end-users, super users, and the Port of Montreal).

In conclusion, **the Orientation and Future Development of the Extranet Functionality** section provides ideas on how the Extranet should evolve in the future.

Limitations and exclusions

As agreed in determining the scope of the project, this Extranet design excludes the following:

1. Preparation of partners'/stakeholders' "readiness";
2. Technical integration to Terminal information systems including interface required to create and send data to be stored in the central database;
3. Design of interfaces/modules required to produce reports;
4. Translation maps;
5. Status of containers transported by railway;
6. Management of partial containers.

Results

ARCHITECTURE

Service Level Requirements:

1. 24x7 availability and monitoring;
2. 98.5% uptime;
3. 8:00 to 18:00 Business Office hours;
4. 24x7 Help Desk.

Sizing Requirements:
The sizing requirements of the Port of Montreal Extranet hardware and equipment are based on the observed traffic of at most 1,000,000 containers transiting the port each year.

Performance Requirements:
Because of the rather small and closed community of interests in the Port of Montreal Extranet, at least in its initial stage, and because of the small amount of transactions, it is easily foreseeable that small to medium systems should suffice for the basic requirements in terms of performance.

The community of interest members and the number of users per community has initially been identified as follows:

Community	Estimated number of members (max.)	Number of users (maximum)	Total
Shipping Lines	12	4	48
Terminals	3	4	12
Freight Forwarders and Custom Brokers	25	4	100
Trucking Companies	25	4	100
Total	65	4	260

Estimated Number of Community Members

Infrastructure:
The Port of Montreal Extranet is a secure and highly available network, featuring the latest technology to better serve its users. Based mainly on Windows 2000 technology with Active Directory Server for resource control and access, it offers an integrated solution for user management along with security features that may cover both the application and data levels.

The core system is an all Windows 2000 solution on Compaq hardware, offering the following advantages: ease of administration, widespread technology, and seamless integration of the different components. Cisco and Nortel equipment are used for telecommunications needs. Sun hardware and a UNIX operating system are used for firewalls and console because of their reliability. HP hardware with an HP-UX operating system using HP Open View is used for monitoring purposes.

APPLICATION

Several stakeholders are involved in Container manipulation at the Port of Montreal:

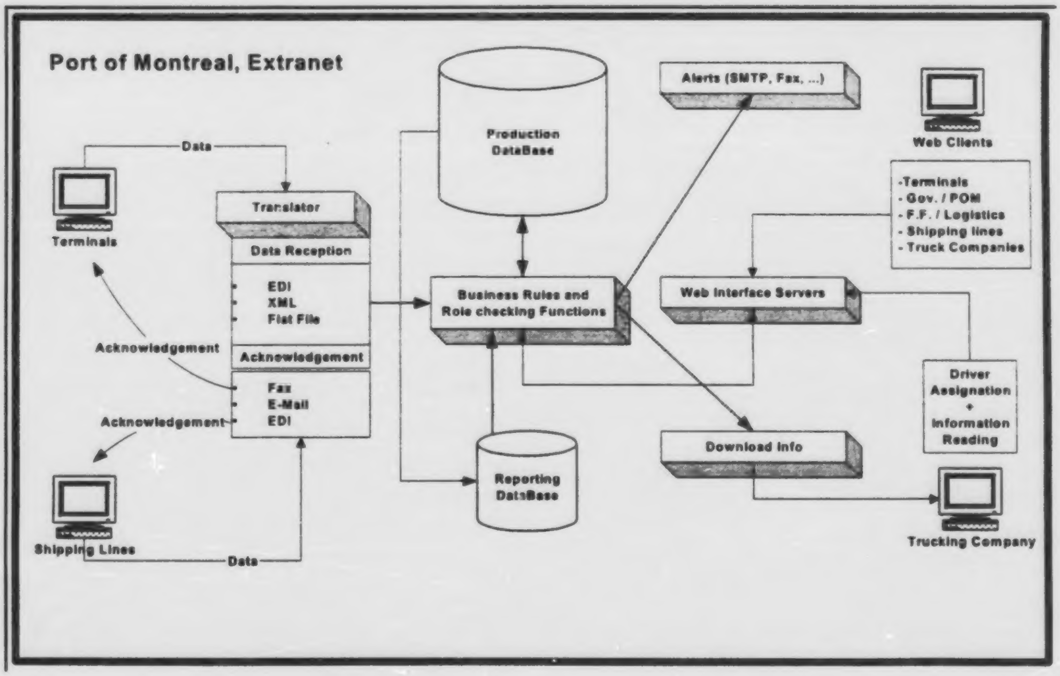
1. Port of Montreal;
2. Shipping Lines;
3. Terminals;
4. Freight Forwarders / Logistics Companies;

5. Trucking Companies;
6. Various Government Departments.

Here is a list of some important functions available to stakeholders in order to provide or retrieve container information:

- Shipping Lines to Provide Voyage Description;
- Shipping Lines to Provide Bills of Lading, including all corresponding Containers and their descriptions for import;
- Freight Forwarders to Assign Trucking Company to Container;
- Freight Forwarders will be able to Manage Empty Memos, used mostly in the Export process to provide information on where to pick up empties and what the pickup requirements are;
- Freight Forwarders or Trucking Companies to Provide Bills of Lading to the Extranet for the export process;
- Terminals to provide all Changes to Container Status to the Extranet, including all releases for the import process;
- Trucking Companies to Assign Truck Driver to Container;
- Trucking Companies to Manage Drivers to keep information related to their drivers in the Extranet;
- Trucking Companies will be able to download information from the Extranet to their proprietary systems to produce internal work orders without having to re-enter information;
- Trucking Companies will be able to upload processed information in their proprietary systems to the Extranet (Truck Driver Assignment).

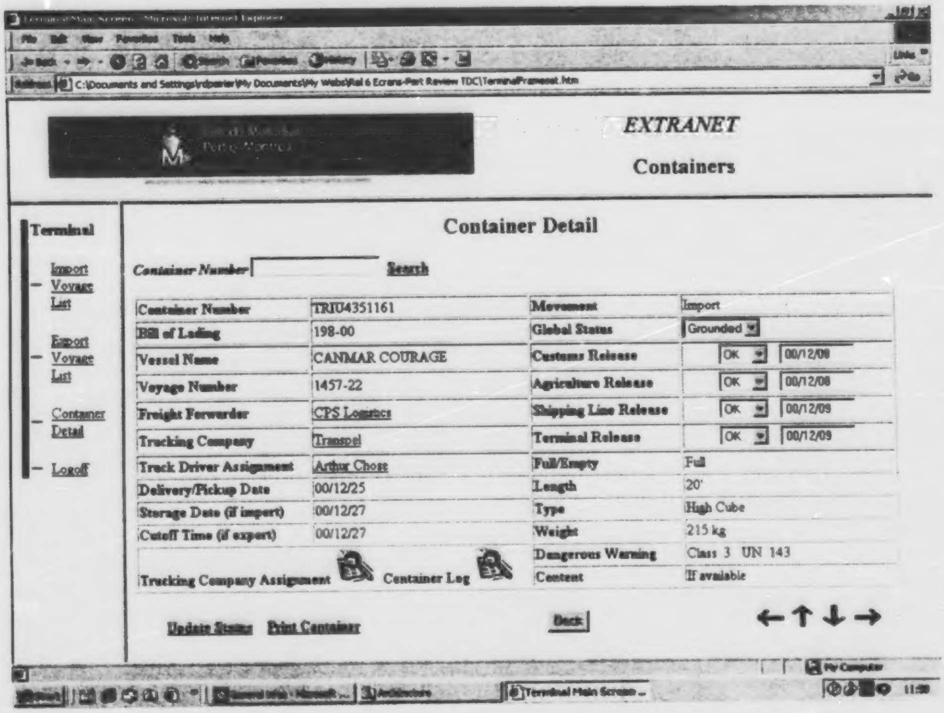
To help stakeholders, the Extranet also includes additional functions such as alerts, which will be sent to specific stakeholders if information changed in the Extranet has a direct impact on them, and reports, which will also be available via a distinct database so as not to affect response time in the production database.


Port of Montreal, Extranet
Data
Terminals
Translator
Data Reception
EDI
XML
Flat File
Acknowledgement
Acknowledgement
Fax
E-Mail
EDI
Acknowledgement
Shipping Lines
Data
Production DataBase
Business Rules and Role checking Functions
Reporting DataBase
Alerts (SMTP, Fax, ...)
Web Clients
-Terminals
- Gov. / POM
- F.F. / Logistics
- Shipping lines
- Truck Companies
Web Interface Servers
Driver Assignation + Information Reading
Download Info
Trucking Company

List of screens in the Extranet:

1. Extranet Entry Point
2. Logoff
3. Import Voyage List (Default screen)
4. Export Voyage List
5. Container Detail
6. Manage Empty Memo (Freight Forwarder only)
7. Manage Drivers (Trucking Company only)
8. Import Container List
9. Export Container List
10. Export Voyage List (Export only)
11. Shipping Line Detail
12. Trucking Company Detail
13. Terminal Detail
14. Freight Forwarder Detail
15. Truck Driver Assignment Detail
16. Trucking Company Assignment
17. Container Log
18. Empty Memo Instructions
19. Trucking Orders (Trucking Company only)
20. Bill of Lading (Freight Forwarder only)
21. Download (Trucking Company only)
22. Manage Export Container (Freight Forwarder or Trucking Company)

Example of an Extranet screen: Container Detail - Terminal:


EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
My Computer
Terminal Main Screen ...
Update Status
Print Container
Back
← ↑ ↓ →

Container Detail

Container Number ☐ Search

Container Number	TRIU4351161	**Movement**	Import
Bill of Lading	198-00	**Global Status**	Grounded
Vessel Name	CANMAR COURAGE	**Customs Release**	OK 00/12/08
Voyage Number	1457-22	**Agriculture Release**	OK 00/12/08
Freight Forwarder	CPS Logistics	**Shipping Line Release**	OK 00/12/09
Trucking Company	Transpel	**Terminal Release**	OK 00/12/09
Truck Driver Assignment	Arthur Chose	**Full/Empty**	Full
Delivery/Pickup Date	00/12/25	**Length**	20'
Storage Date (if import)	00/12/27	**Type**	High Cube
Cutoff Time (if export)	00/12/27	**Weight**	215 kg
Trucking Company Assignment	**Container Log**	**Dangerous Warning**	Class 3 UN 143
		Content	If available

DATABASE

Port of Montreal Extranet Data Model
After determining the business reality of the Terminals, Freight Forwarders, Trucking Companies, Shipping Lines, and Government agencies, the Conceptual Data Model was designed to represent the key business concepts and constraints related to Container status management, in the context of import and export Terminals. A Physical Data Model was then derived to represent the business concepts and constraints in terms of database components. Sybase's Power Designer 7.5 case tool was used to perform these steps and to generate the model for an MS SQL Server 7 or 2000 platform.

This section of the Extranet Design is very complete in terms of details and documentation. It covers all the elements of the database design including:

- Table lists;
- Table columns list;
- Table indexes list;
- Reference list;
- Domain list;
- Business rules list;
- Graphical representation of the physical database tables, relationships and entities.

SECURITY

New security technologies are being developed every day that promise much. They often deliver what they promised, but only cover a portion of the system's security. The challenge when choosing security technology is to find the right combination to achieve:

1. **Equilibrium**: the right protection for all components against threats;
2. **Heterogeneity and integration**: a variety of technologies that ensure a wide range of protection against hackers, work well together, and communicate with each another;
3. **Ease of use**: easy to install and manage for the administrator and, most importantly, the end user;
4. **Monitoring and proactive response**: technology that sends alerts when a problem occurs and is capable of launching a countermeasure or a fix;
5. **Sufficient support**: technology supported by back-end engineers and research teams to monitor emerging threats;
6. **Availability of certified resources:** to ensure independence and access to quality resources;
7. **Cost-effectiveness**: not only in terms of acquisition, but also in terms of manpower and equipment.

Security Requirements
Various groups of stakeholders are involved in the Extranet, and improper or unauthorized access could have undesirable business consequences. A hierarchical structure is therefore necessary to group the different access families. A strictly controlled single logon should give network access only to authorized participants, and within the network, grant application and data access by applying strict business rules.

The security access control process is based on Windows 2000 Active Directory Server Technology, and SSL encryption ensures data confidentiality over the Internet. Combined with the network components described in the Architecture section, the Extranet is well protected against possible threats with respect to previously established criteria.

Making the Port of Montreal Extranet publicly available on the Internet is a desirable feature from both an economical and accessibility standpoint, but improper network security could lead to unwanted intrusions, causing political damage that could ruin the credibility of the Extranet. The importance of implementing strong security measures should therefore not be underestimated.

OPERATIONS / SERVICE LEVEL AGREEMENT

Details Regarding Extranet Operations and Metrics

The Extranet provider's priority commitments should be to deliver the highest quality service and guarantee a high level of service for all activities over which it has control. To ensure a high level of service and efficiency, operations should be organized to offer problem resolution escalation procedures. A reported problem would therefore become the responsibility of Support Services and be resolved at the appropriate level.

Customer and Support Services should be organized to provide a single point of contact for all stakeholders.

Extranet Provider Customer Service and the Technical Help Desk should be set up with the following characteristics to provide a single point of contact for all stakeholders:

- All standard customer and support services should be offered in both French and English;
- Customer and support services should be equipped with a specific toll-free telephone number accessible throughout North America;
- Agents responding to calls should attempt to classify each call by level of difficulty and call priority, following a custom script and call-routing process;
- The Help Desk should handle all technical requests and activities involved in problem resolution, and be responsible for trouble reporting;
- The Help Desk should initiate escalation procedures when resolution time is not achieved;
- The Help Desk should advise customers at regular intervals of the status of the problem resolution;
- The Business Office should handle all activities regarding registration and billing;
- The Business Office should handle all account information and billing inquiries;
- Technical support should be available on a 24/7 basis (except on holidays) for all components under the Extranet provider's control.

The Service Provider should nominate a Customer Service Manager (CSM), who would:

- Represent the Extranet provider;
- Act as the single point of contact between the super users (primary contacts from the Extranet member community) and the Port of Montreal Administrator;
- Manage the Operations Work Order (OWO);
- Obtain authorizations from the POM Administrator for company eligibility and OWO.

Each member company of the Extranet should nominate a super user, who would:

- Represent the members of the Extranet community (one per company);
- Provide the information required to set up the company's account in the Extranet;
- Authorize access to the Business Office for the company's end users;
- Act as the primary interface with the Extranet provider's CSM, Help Desk, and Business Office;
- Provide first-level support to the company's end users.

The Help Desk and Business Office should submit monthly reports to POM administration to validate SLA metrics and highlight aspects of the Extranet that could be improved. Reports should contain elements such as:

- Total calls received;
- Total calls answered;
- Average Speed of Answer (ASA);

- Average Talk Time (ATT);
- Total tickets opened;
- Total tickets closed;
- Total tickets closed on initial call;
- Number of billing queries;
- Average resolution time;
- Number of customer profile updates (add, modify, delete) received;
- Number of customer profiles created;
- Number of customer profiles modified or deleted;
- Number of Welcome Kits distributed;
- Volume of customer information (user ID, password) distributed;
- Number of problem tickets;
- Breakdown of tickets by problem category (urgent, high, routine) and further breakdown of customer problems;
- Percentage of problems within objectives;
- Percentage of problems surpassing objectives;
- Percentage of repeated problems.

Escalation Procedures

To ensure a high level of service and efficiency, operations should be organized to offer problem resolution escalation procedures. A reported problem would therefore become the responsibility of the Help Desk and be resolved at the appropriate level. Support should be offered beginning at the first level.

Call escalation procedures should be defined and documented. Internal escalation charts describe the vertical managerial and technical escalation levels. These charts must be followed to respect the Extranet provider's commitment with its customers.

ORIENTATION AND FUTURE DEVELOPMENT

As stated earlier, the Extranet application described in the report entitled *Port of Montreal Extranet Design* is the first step toward a fully integrated solution for container management at the Port of Montreal.

New functions can be added to the Extranet application to further improve container tracking and tracing. The following functions will be added to the Extranet application as soon as the current configuration has demonstrated appreciable gains in efficiency and productivity at the Port of Montreal:

- Functions for tracking and tracing containers handled by railway companies;
- Functions for handling several containers per order to carrier, rather than the current one-container-per-order basis;
- Functions to exchange information with other international ports that handle containers destined for POM;
- Integration with smart card authentication for truck drivers, that sends transactions to the Extranet when the driver arrives at or leaves from a specific terminal;
- Functions for electronic container billing and electronic transfer of funds for various stakeholders;
- Functions to view chassis and container images from terminal gate video cameras in order to assess damage and as well as the queuing situation at the gate. Images from highway cameras could also be integrated to provide information to trucking companies;
- Graphical representation of containers (different pictures for regular, open top, high cube, flat, or reefer);
- Integrated OCR line-scan cameras to identify container ID;

- Functions to produce official Extranet reports and documents (e.g., the Terminal Interface Release, documents for customs, etc.);
- Functions to allow trucking companies to acknowledge empty memos. Additional fields on screens could indicate to the freight forwarder that the trucking company has accepted the memo.

Conclusions / Recommendations

The Extranet is an excellent solution for improving information sharing and efficiency at the Port of Montreal. The application is designed to evolve easily by adding new functions and business rules, and has the potential to achieve results in the six key areas targeted to improve overall communication among stakeholders in the Port of Montreal community.

The pilot Extranet implementation should be done with a limited number of carefully selected participants to fine-tune the solution for more general use and minimize end-user frustration. The involvement of senior management and syndicated workers in the implementation of the pilot is a key success factor.

Authorization from shipping lines with regard to information disclosed on the Extranet should be granted as soon as possible.

SOMMAIRE

Contexte

Le Centre de développement des transports (CDT) et le Port de Montréal ont uni leurs forces pour mener à bien un projet de technologie intermodale visant à améliorer l'efficacité et la productivité des mouvements de conteneurs dans le port. L'accent est mis, pour l'instant, sur l'interface terminal-camion, mais dans une phase ultérieure, tous les modes de transport seront touchés. Ce projet s'insère dans un programme de plus grande envergure ayant pour but la mise en place d'une technologie fondée sur Internet pour permettre l'échange parfaitement intégré de documents électroniques entre les partenaires commerciaux du Port et d'autres organismes intéressés.

C'est dans ce contexte que le CDT a attribué à BCE Emergis un marché visant les spécifications de conception détaillée d'un réseau Extranet pour la collectivité du port de Montréal. La solution Extranet avait été préconisée au terme d'une étude antérieure (TP 13531E) menée par GE Information Services Canada pour le compte du CDT. L'Extranet misera sur les potentialités d'Internet dans le domaine de l'échange de données électroniques. Il permettra en effet aux intervenants dotés de capacités EDI de communiquer avec leurs partenaires commerciaux non dotés de telles capacités, en utilisant Internet comme passerelle de communication. L'architecture de l'Extranet sera une architecture ouverte et il sera doté des logiciels les plus performants.

Les spécifications de conception de l'Extranet du port de Montréal exposées ci-après sont suffisamment détaillées pour permettre le développement et l'implémentation d'un système pleinement opérationnel.

Portée, démarche et méthodologie

Deux comités ont été créés pour mener à bien le projet : un Comité directeur, composé de cadres du Port de Montréal, des terminaux à conteneurs du port et d'une entreprise de logistique, a validé l'orientation donnée à l'étude et a aidé le Comité de projet à identifier les personnes-ressources chez qui aller chercher l'information et auprès de qui valider les flux de travaux; et le Comité de projet, constitué d'un expert en technologie des systèmes de transport du CDT et de deux membres du service TI du Port de Montréal et de la division TI de BCE Emergis.

Les auteurs ont suivi une démarche en quatre étapes pour établir leurs spécifications :

- examen du rapport de l'étude antérieure réalisée par GE Information Services Canada, fondée sur des entrevues avec divers intervenants du port, et définition de la portée du projet avec le CDT et le Port de Montréal;
- élaboration d'une série d'écrans prototypes et validation de ceux-ci au cours d'entrevues avec des transitaires, Douanes Canada, des entreprises de transport, des terminaux, des lignes maritimes et des entreprises de logistique. Au total, neuf intervenants différents ont pris part à la validation des écrans. Certains ont participé à trois rencontres;
- conception de l'Extranet comme tel, à partir des écrans, des flux de travaux et des principales contraintes établies lors des rencontres avec les divers intervenants;
- examen des spécifications définitives concernant l'Extranet avec le groupe TI du Port de Montréal et obtention de l'approbation du CDT et du Comité directeur du projet.

Le but visé, en dotant le port de Montréal d'un Extranet, est d'améliorer l'efficacité globale des opérations, notamment en réduisant la congestion aux barrières et en améliorant l'interface camion-terminal. Voici les principales améliorations escomptées par suite de l'implémentation de l'Extranet :

1. amélioration des services aux membres de la collectivité portuaire et aux utilisateurs finals potentiels;

2. possibilité pour les membres munis de l'accès usager-réseau de connaître en tout temps la situation des conteneurs;
3. élargissement de la clientèle du commerce électronique;
4. diminution de l'attente aux barrières des terminaux;
5. amélioration de la communication entre tous les membres du réseau;
6. réduction des erreurs de saisie des données et d'écriture.

D'un point de vue de gestion, la portée du projet, de même que les jalons, les ressources et le budget afférents au projet ont été établis en fonction de ces six objectifs.

Le rapport, intitulé *Port of Montreal Extranet Design*, comprend cinq sections :

- **La section Architecture** présente l'infrastructure de l'Extranet, soit les divers réseaux et composants nécessaires pour le rendre fonctionnel.

  Elle expose la nature et les particularités des divers composants matériels et logiciels de l'Extranet, et donne une estimation des coûts associés à la mise en place d'un Extranet conforme aux spécifications énoncées dans le rapport.

- **La section Application** décrit toutes les fonctions qui permettent aux intervenants (lignes maritimes, terminaux, transitaires, entreprises de camionnage et ministères) d'échanger des données relatives aux conteneurs. Elle comprend la description des écrans, des données à fournir, des contrôles à exercer, des fonctions de recherche, de la situation des conteneurs, des transactions par lots, des alertes, de l'archivage et des rapports.

  Chacune des fonctions et des contraintes (règles commerciales) sont suffisamment détaillées pour permettre le développement de l'application. Le coût de développement de l'application n'est pas précisé : il devra être établi par suite d'une Demande de propositions (DDP) qu'il reste à lancer.

- **La section Base de données** présente la base de données centrale qui renferme et tient à jour toute l'information relative aux conteneurs. Elle comprend un modèle de données relationnel détaillé qui comprend tous les objets, éléments de données, relations, listes de tables et champs nécessaires, de même qu'un glossaire des éléments.

- **La section Sécurité** porte sur la conception de la sécurité pour le système. La sécurité est un processus sous examen constant : il n'existe aucune solution parfaite en cette matière. Cette section offre donc des lignes directrices et des recommandations, ainsi que les résultats d'une analyse du risque associé à l'Extranet, afin de garantir la sécurité du réseau à un coût raisonnable.

- **La section Exploitation/Entente sur le niveau de service** expose l'Entente sur le niveau de service exigée par le Port de Montréal pour l'Extranet. Cette entente porte sur les services de soutien à la clientèle, le processus d'inscription, la procédure d'escalade, et les politiques d'exploitation. Elle définit en outre la nature des rapports entre le fournisseur de service Extranet et les membres du réseau, y compris les rôles et responsabilités de chaque participant (utilisateurs finals, super utilisateurs, Port de Montréal).

Le rapport se termine sur des propositions quant à l'**Orientation et l'évolution future de l'Extranet**.

Limites et exclusions

Comme convenu au moment de définir la portée du projet, la conception de l'Extranet ne comprend pas les volets suivants :

1. préparation des partenaires/intervenants en vue de l'implémentation;
2. intégration technique aux systèmes d'information des terminaux (interface nécessaire pour créer et transmettre les données à stocker dans la base de données centrale);

3. conception des interfaces/modules nécessaires pour générer les rapports;
4. traduction d'une norme à une autre;
5. situation des conteneurs transportés par chemin de fer;
6. gestion des conteneurs partiels.

Résultats

ARCHITECTURE

Exigences relatives au niveau de service :

1. Disponibilité et surveillance 24 heures sur 24, 7 jours par semaine
2. Temps de disponibilité de 98,5 %
3. Heures de bureau : 8 h à 18 h
4. Service de dépannage disponible 24 heures sur 24, 7 jours par semaine

Exigences relatives à la taille du système :
Le matériel et l'équipement de l'Extranet du port de Montréal doivent pouvoir traiter un trafic annuel observé d'au plus 1 000 000 de conteneurs.

Exigences relatives aux performances :
Comme l'Extranet regroupera, à tout le moins au début, une collectivité relativement restreinte et fermée, et comme le nombre de transactions sera limité, on peut facilement prévoir qu'il suffira d'un petit système ou d'un système moyen pour répondre aux exigences de base en ce qui a trait aux performances.

Une première évaluation a débouché sur les chiffres ci-après concernant le nombre de membres dans chaque groupe composant la collectivité du port et le nombre d'utilisateurs chez ces membres :

Groupe	Nombre estimatif de membres (max.)	Nombre d'utilisateurs (max.)	Total
Lignes maritimes	12	4	48
Terminaux	3	4	12
Transitaires et courtiers en douane	25	4	100
Entreprises de camionnage	25	4	100
Total	65	4	260

Nombre estimatif de membres au sein de la collectivité du port

Infrastructure :
L'Extranet du port de Montréal est un réseau sûr et très disponible, qui utilise la technologie de pointe pour mieux servir ses utilisateurs. Articulé essentiellement autour de la plate-forme Windows 2000 et du produit *Active Directory Server* pour le contrôle des ressources et l'accès à celles-ci, l'Extranet offre une solution intégrée pour la gestion des utilisateurs et des dispositifs de sécurité protégeant à la fois l'application et les données.

Le système de base est constitué de la plate-forme Windows 2000 implantée dans un ordinateur Compaq. Ce système offre les avantages suivants : facilité d'administration, technologie répandue, intégration facile de nouveaux composants. Pour les télécommunications, les matériels Cisco et Nortel sont utilisés. Pour ce qui est des coupe-feu et de la console, les produits Sun, tournant sur UNIX, ont été choisis, en raison de leur fiabilité. Un matériel HP avec une plate-forme HP-UX et HP Open View est utilisé pour le contrôle.

APPLICATION

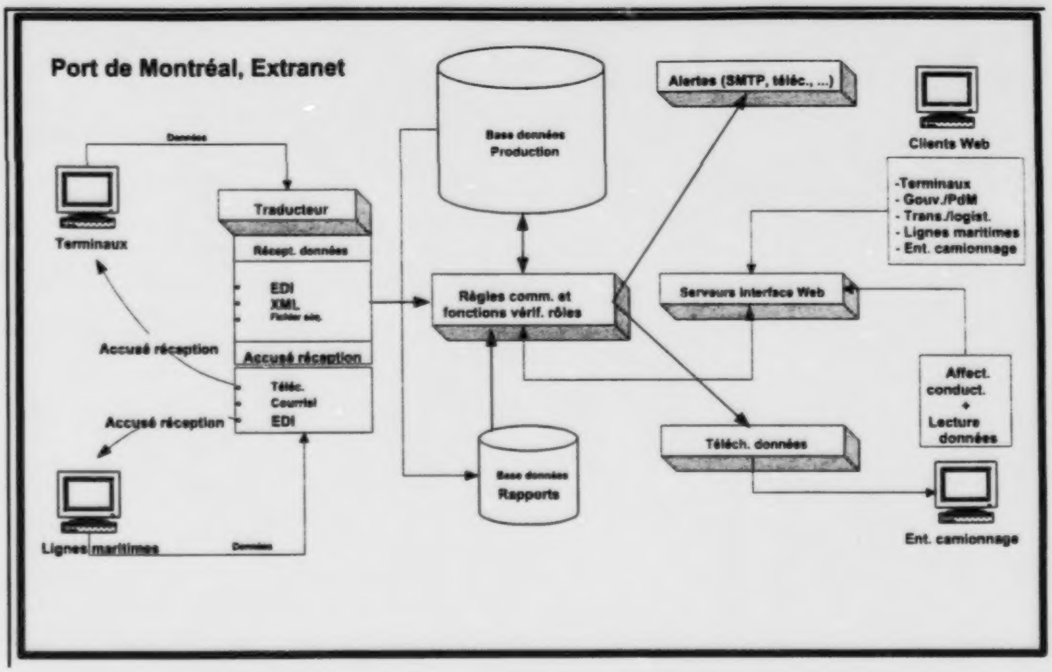
Plusieurs intervenants sont concernés par la manutention des conteneurs au port de Montréal :

1. le Port de Montréal
2. les lignes maritimes
3. les terminaux à conteneurs
4. les transitaires/entreprises de logistique
5. les entreprises de camionnage
6. divers ministères gouvernementaux.

Voici quelques-unes des principales fonctions à la disposition des intervenants pour transmettre ou récupérer les données relatives aux conteneurs :

- fourniture, par les lignes maritimes, des itinéraires;
- fourniture, par les lignes maritimes, des connaissements, y compris tous les conteneurs correspondants et leur description pour le processus d'importation;
- affectation, par les transitaires, d'une entreprise de camionnage à un conteneur;
- gestion, par les transitaires, des ordres de ramassage des conteneurs vides, utilisés principalement dans le processus d'exportation pour indiquer où les conteneurs vides doivent être ramassés et selon quelles modalités;
- fourniture, par les transitaires et les entreprises de camionnage, des connaissements pour le processus d'exportation;
- fourniture, par les terminaux, des changements à la situation des conteneurs y compris les libérations, les dédouanements, pour le processus d'importation;
- affectation, par les entreprises de camionnage, d'un conducteur à un conteneur;
- gestion, par les entreprises de camionnage, des données sur les conducteurs;
- téléchargement vers leurs systèmes respectifs, par les entreprises de camionnage, de l'information contenue dans l'Extranet, afin de produire des ordres de travail internes, sans avoir à saisir de nouveau les données;
- téléchargement vers Extranet, par les entreprises de camionnage, de l'information traitée par leurs systèmes respectifs (affectation des conducteurs).

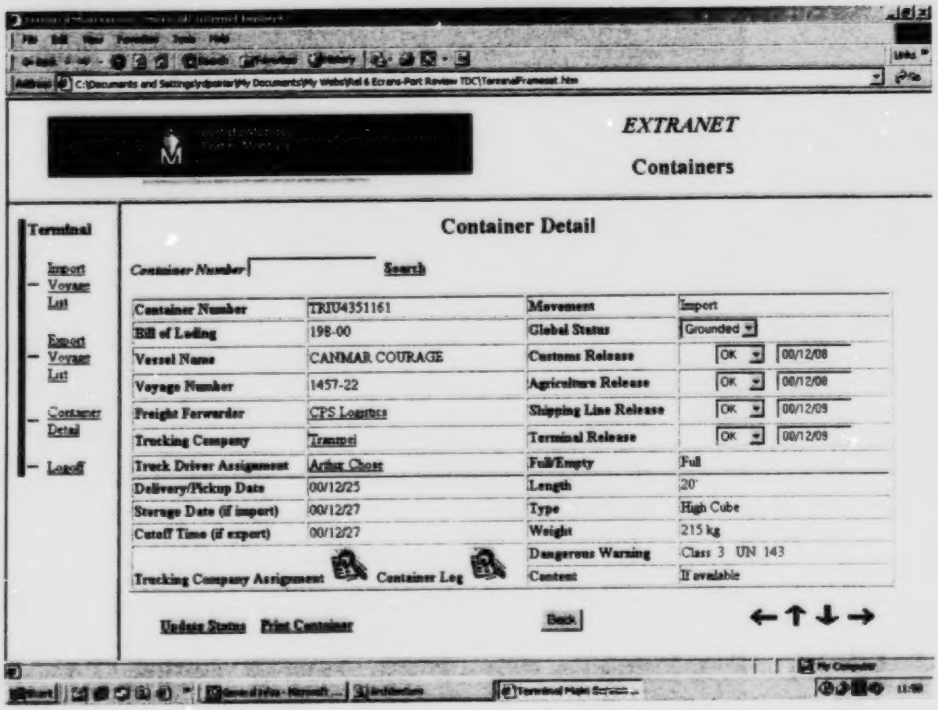
L'Extranet comprend aussi d'autres fonctions que les intervenants trouveront utiles. Ainsi, des intervenants pourront être alertés si de nouvelles données entrées dans l'Extranet devaient avoir des répercussions directes sur eux; de plus, les rapports seront accessibles via une base de données distincte, pour éviter d'allonger le temps de réponse de la base de données de production.


Port de Montréal, Extranet
Données
Terminaux
Traducteur
Récept. données
EDI
XML
Fichier séq.
Accusé réception
Accusé réception
Téléc.
Courriel
EDI
Accusé réception
Lignes maritimes
Données
Base données
Production
Règles comm. et
fonctions vérif. rôles
Base données
Rapports
Alertes (SMTP, téléc., ...)
Clients Web
-Terminaux
- Gouv./PdM
- Trans./logist.
- Lignes maritimes
- Ent. camionnage
Serveurs interface Web
Affect.
conduct.
+
Lecture
données
Téléch. données
Ent. camionnage

Liste des écrans de l'Extranet :

1. Point d'accès à Extranet
2. Fermeture de session
3. Liste des arrivées - Importation (Écran par défaut)
4. Liste des départs - Exportation
5. Données sur le conteneur
6. Gestion des ordres de ramassage des conteneurs vides (Réservé aux transitaires)
7. Gestion des conducteurs (Réservé aux entreprises de camionnage)
8. Liste de conteneurs - Importation
9. Liste de conteneurs - Exportation
10. Description du voyage - Exportation (Réservé à l'exportation)
11. Information sur la ligne maritime
12. Information sur l'entreprise de camionnage
13. Information sur le terminal
14. Information sur le transitaire
15. Affectation des conducteurs
16. Affectation des entreprises de camionnage
17. Registre des conteneurs
18. Instructions - Conteneurs vides
19. Ordres de travail - Camionnage (Réservé aux entreprises de camionnage)
20. Connaissement (Réservé aux transitaires)
21. Téléchargement (Réservé aux entreprises de camionnage)
22. Gestion des conteneurs - Exportation (Réservé aux transitaires/Entreprises de camionnage)

Exemple d'un écran Extranet : Données sur le conteneur – Terminal :



Container Detail

Container Number	TRIU4351161	Movement	Import
Bill of Lading	198-00	Global Status	Grounded
Vessel Name	CANMAR COURAGE	Customs Release	OK 00/12/08
Voyage Number	1457-22	Agriculture Release	OK 00/12/08
Freight Forwarder	CPS Logistics	Shipping Line Release	OK 00/12/09
Trucking Company	Transpei	Terminal Release	OK 00/12/09
Truck Driver Assignement	Arthur Chost	Full/Empty	Full
Delivery/Pickup Date	00/12/25	Length	20'
Storage Date (if import)	00/12/27	Type	High Cube
Cutoff Time (if export)	00/12/27	Weight	215 kg
Trucking Company Assignement	Container Log	Dangerous Warning	Class 3 UN 143
		Content	If available

BASE DE DONNÉES

Modèle de données – Extranet du port de Montréal

Après avoir cerné la réalité commerciale des terminaux, transitaires, entreprises de camionnage, lignes maritimes et organismes gouvernementaux, les chercheurs ont élaboré le modèle de données conceptuelles qui représente les principaux concepts et principales contraintes reliés à la gestion de la situation des conteneurs, du point de vue des terminaux d'importation et d'exportation. Ils ont ensuite élaboré un modèle de données réelles qui représente les concepts et les contraintes reliés aux composants de la base de données. Ils se sont servi de l'outil Power Designer 7.5 de Sybase pour réaliser ces tâches et pour produire le modèle pour une plate-forme MS SQL Server 7 ou Win 2000.

Cette section de la conception de l'Extranet est très détaillée. Elle couvre tous les éléments de la conception de la base de données, y compris :

- listes de tables;
- liste des colonnes des tables;
- liste des lignes des tables;
- liste des références;
- liste des domaines;
- liste des règles commerciales;
- représentation graphique des tables de données réelles, des relations et des entités.

SÉCURITÉ

De nouvelles technologies prometteuses en matière de sécurité apparaissent chaque jour. La plupart du temps, elles tiennent leurs promesses, mais elles ne protègent généralement qu'une partie du réseau. Le défi, lorsque l'on doit opter pour une technologie, est de trouver la combinaison idéale qui offrira les caractéristiques suivantes :

1. **Équilibre** : une protection adéquate de tous les composants.
2. **Hétérogénéité et intégration** : des technologies diversifiées, qui assurent une protection complète contre les pirates, qui s'agencent bien ensemble et communiquent facilement entre elles.
3. **Facilité d'utilisation** : facile à installer et à gérer pour l'administrateur et, plus important encore, pour l'utilisateur final.
4. **Surveillance et mesures proactives** : technologie qui envoie des messages d'alerte lorsque survient un problème et qui peut déclencher une mesure pour y remédier.
5. **Soutien adéquat** : technologie soutenue par des techniciens et des équipes de recherche spécialisés, pouvant maîtriser toute nouvelle menace.
6. **Disponibilité de ressources certifiées** : garantit l'autonomie et l'accès à des ressources de qualité.
7. **Coût raisonnable** : non seulement le coût d'achat, mais aussi les coûts de main-d'œuvre et de matériel.

Exigences relatives à la sécurité

Divers groupes d'intervenants sont reliés par l'Extranet. Toute intrusion dans le réseau ou tout accès non autorisé pourrait avoir des conséquences néfastes sur leurs activités. D'où la nécessité d'instituer une structure hiérarchique pour regrouper les différentes familles d'accès. Il importe d'avoir une seule procédure d'ouverture de session rigoureusement contrôlée, qui permet aux seuls membres autorisés d'accéder au réseau, et à l'intérieur du réseau, une autre procédure donnant accès aux applications et aux données selon des règles commerciales strictes.

Le contrôle des accès utilise la technologie *Active Directory Server* de Windows 2000. Quant au cryptage en SSL, il garantit la confidentialité des données sur Internet. Si on ajoute à cela les composants décrits dans la section Architecture, on obtient un Extranet qui est bien protégé contre les menaces éventuelles, en regard des critères établis antérieurement.

Il serait souhaitable, tant pour des motifs de rentabilité que d'accessibilité, de rendre l'Extranet du port de Montréal largement accessible par Internet, mais un réseau dont la sécurité comporterait des failles pourrait prêter flanc à des intrusions susceptibles de nuire à la crédibilité de l'Extranet. Il convient donc d'être pleinement conscient de la nécessité de mettre en œuvre des dispositifs de sécurité à l'épreuve de toute intrusion.

EXPLOITATION/ENTENTE SUR LE NIVEAU DE SERVICE

Information concernant l'exploitation et les paramètres d'exploitation d'Extranet

Le fournisseur de l'Extranet doit s'engager en priorité à assurer un service de qualité supérieure et à donner un niveau élevé de service pour toutes les activités qui relèvent de sa compétence. Pour assurer un niveau élevé de service et d'efficacité, l'exploitation doit être articulée autour d'une procédure d'escalade. Lorsqu'un problème est signalé, il devient la responsabilité des services de soutien et il doit être résolu au palier approprié.

Les Services à la clientèle et les Services de soutien doivent être organisés de façon à offrir un seul point de contact à tous les intervenants.

Pour faire en sorte que les intervenants puissent s'adresser à un seul point de contact, les Services à la clientèle et le Bureau de dépannage du fournisseur Extranet doivent être organisés comme suit :

- tous les services à la clientèle et les services de soutien standard doivent être offerts en français et en anglais;
- les services à la clientèle et les services de soutien doivent être directement accessibles par un même numéro de téléphone sans frais, valable partout en Amérique du Nord;

- les agents qui répondent aux appels doivent autant que possible classer chaque appel selon son degré de complexité et sa priorité, après avoir fait les inscriptions usuelles et acheminé la demande de service;
- le Bureau de dépannage doit traiter toutes les demandes de services et les activités techniques reliées à la solution des problèmes; il lui incombe en outre de signaler les pannes;
- le Bureau de dépannage doit faire appel à un palier supérieur d'intervention lorsque le problème n'est pas solutionné dans le délai prescrit;
- le Bureau de dépannage doit informer périodiquement les clients de l'état de la situation jusqu'à ce que le problème soit solutionné;
- le Bureau d'affaires est responsable de toutes les activités d'inscription et de facturation;
- le Bureau d'affaires doit traiter toutes les demandes de renseignements sur les comptes et la facturation;
- le soutien technique doit être accessible 24 heures sur 24, 7 jours par semaine (sauf les jours fériés) pour tous les composants relevant de la responsabilité du fournisseur Extranet.

Le fournisseur Extranet doit désigner un Chef des services à la clientèle (CSC), dont le rôle consiste à :

- représenter le fournisseur Extranet;
- être l'unique point de contact entre les super utilisateurs (principaux contacts chez les membres de la collectivité Extranet) et l'administrateur du Port de Montréal;
- gérer les ordres de travail concernant l'exploitation (OTE);
- obtenir les autorisations de l'administrateur du Port de Montréal concernant l'admissibilité des entreprises et les OTE.

Chaque entreprise membre du réseau Extranet doit désigner un super utilisateur, dont le rôle consiste à :

- représenter les membres de la collectivité Extranet (un représentant par entreprise);
- communiquer l'information nécessaire pour établir le compte de l'entreprise dans l'Extranet;
- autoriser l'accès au Bureau d'affaires des utilisateurs finals de l'entreprise;
- agir à titre de principale interface entre l'entreprise et le CSC, le Bureau de dépannage et le Bureau d'affaires du fournisseur Extranet;
- fournir un soutien de première ligne aux utilisateurs finals au sein de l'entreprise.

Le Bureau de dépannage et le Bureau d'affaires doivent remettre des rapports mensuels à l'administration du Port de Montréal afin de valider les paramètres de l'Entente sur le niveau de service et de mettre en relief les améliorations à apporter à l'Extranet. Les rapports doivent notamment contenir ce qui suit :

- nombre total d'appels reçus;
- nombre total d'appels ayant reçu une réponse;
- temps moyen de réponse;
- temps moyen de conversation;
- nombre total de tickets d'incident ouverts;
- nombre total de tickets d'incident fermés;
- nombre total de tickets d'incident fermés au premier appel;
- nombre de demandes de renseignements concernant la facturation;
- temps moyen de solution;
- nombre de mises à jour de profils de clients (ajout, modification, suppression) reçues;
- nombre de profils de clients créés;
- nombre de profils de clients modifiés ou supprimés;
- nombre de trousses d'accueil distribuées;

- volume de données d'authentification (nom d'utilisateur, mot de passe) transmises;
- nombre de tickets d'incident;
- ventilation des tickets d'incident selon la catégorie de problème (urgent, très complexe, courant) et selon le client;
- pourcentage des problèmes résolus dans les délais visés;
- pourcentage des problèmes résolus dans un délai supérieur au délai visé;
- pourcentage de problèmes devenus répétitifs.

Procédure d'escalade
Pour garantir un niveau élevé de service et d'efficacité, l'exploitation doit être organisée de façon à prévoir divers paliers d'intervention pour la résolution des problèmes. Dès qu'il est signalé, un problème devient la responsabilité du Bureau de dépannage et il doit être résolu au palier approprié. Le soutien doit d'abord être offert par le premier palier d'intervention.

La procédure d'escalade pour la solution des problèmes doit être bien définie et documentée. Des organigrammes internes doivent décrire les divers paliers de gestion et de compétence technique. Il importe que ces hiérarchies soient respectées, pour que le fournisseur Extranet soit à la hauteur de ses engagements à l'égard de ses clients.

ORIENTATION ET ÉVOLUTION FUTURE

Encore une fois, l'application Extranet décrite dans le rapport constitue le premier pas vers une solution complètement intégrée pour la gestion des conteneurs dans le port de Montréal.

Des fonctions pourront être ajoutées pour rendre encore plus faciles le suivi et la localisation des conteneurs. Ainsi, les fonctions ci-après seront ajoutées dès que la configuration actuelle aura fait la démonstration de gains appréciables d'efficacité et de productivité au port de Montréal :

- fonctions de suivi et de localisation des conteneurs manutentionnés par les compagnies de chemin de fer;
- fonctions permettant de traiter plusieurs conteneurs par ordre transmis au transporteur, plutôt qu'un seul conteneur par ordre, comme c'est le cas présentement;
- fonctions visant l'échange d'information avec d'autres ports internationaux qui manutentionnent des conteneurs destinés au port de Montréal;
- intégration d'un système d'authentification des conducteurs par carte à puce, qui déclenche une opération sur l'Extranet lorsque le conducteur arrive à un terminal donné ou le quitte;
- fonctions permettant la facturation électronique et le transfert électronique de fonds pour les divers intervenants;
- fonctions de visualisation des châssis et des conteneurs depuis des caméras vidéo installées aux barrières des terminaux, afin d'évaluer les dommages au matériel et la longueur de la file d'attente à la barrière. Il serait aussi possible d'intégrer des images de caméras disposées en bordure de route à l'intention des entreprises de camionnage;
- représentation graphique des différents types de conteneurs (régulier, ouvert, à grand volume, plate-forme, frigorifique);
- caméras de reconnaissance optique de caractères (ROC) pour l'identification en temps réel des conteneurs;
- fonctions permettant de produire des rapports et documents officiels par l'Extranet (p. ex., libérations - interface terminal, documents pour les douanes, etc.);
- fonctions permettant aux entreprises de camionnage d'accuser réception des ordres de ramassage des conteneurs vides. D'autres champs sur les écrans pourraient indiquer au transitaire que l'entreprise de camionnage a bien reçu l'ordre.

Conclusions/Recommandations

L'Extranet est un excellent moyen d'améliorer l'échange d'information et l'efficacité des opérations au port de Montréal. Application évolutive, il est possible d'y ajouter de nouvelles fonctions et règles commerciales, et elle est d'ores et déjà en mesure de produire les résultats voulus dans les six secteurs clés ciblés afin d'améliorer la communication parmi les intervenants qui font partie de la collectivité du port de Montréal.

L'implémentation pilote de l'Extranet devrait se limiter à un petit groupe de participants triés sur le volet afin de peaufiner le système avant de l'étendre à un plus grand nombre d'utilisateurs, sans susciter de frustration. Pour la réussite d'une telle implémentation, il est essentiel d'obtenir la collaboration de la haute direction et des travailleurs syndiqués.

L'autorisation des lignes maritimes en ce qui a trait à l'information divulguée sur l'Extranet devrait être obtenue le plus tôt possible.

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GLOSSARY

Terms	Definitions
ACL	Access Control List
Actor	Generic stakeholder who plays a role in the Extranet. An actor can be a Carrier (trucking or railroad), a Freight Forwarder, a Shipping Line, a Terminal, a Port, a Broker, or a Government agency.
Actual event	Event related to a Container and reported in the Extranet.
Administrator	Person responsible for the maintenance of the Extranet System.
ADO	Active Data Object
ADS	Active Directory Server
Application	A computer program used for a particular process, such as database management or word processing.
Architecture	A set of rules for building programs, networks, or other structures.
Archive	To back up old files and remove them from immediate access. They can be retrieved and used whenever necessary.
ASCII	American Standard Code for Information Interchange. The basis of character sets used in almost all present-day computers.
ASP	Active Server Page(s)
Authentication	The verification of the identity of a person or process for Extranet access.
Back-End	Very powerful, non-user-friendly computer essentially used for file and database management.
Bandwidth	The range of frequencies a circuit will pass.
Bill of Lading	Official document prepared by the Freight Forwarder and transmitted to the Shipping Lines to form the Manifest. It refers to 'loaded' units (Containers) under their responsibility that share the same voyage at the Port of Montreal.
Booking Number	Reservation number provided by a Shipping Line to a customer in order to reserve room on a voyage. Most Booking reservations are performed by the Freight Forwarder. The booking number is used in the Export process.
Bridge	An interconnection device, sometimes working within a PC and sometimes within a special-purpose computer, that can connect LANs using similar or dissimilar data links such as Ethernet, Token-Ring, and X25.
BGP4	Border Gateway Protocol (version 4). An exterior gateway protocol defined in RFCs 1267 and 1268. Its design is based on experience gained with EGP, as defined in STD 18, RFCs 1267 and 1268.
Cancel Info	A Cancel Info is created each time an Actual Event is cancelled. It is then possible to keep track of the context of the cancellation (date, time, reason, and free-form memo).
Carrier	A railway or trucking transport company.
Certificate	An entity (typically a company) that issues digital certificates to other entities (organizations or individuals) to allow them to prove their identity to others.
Clustering	Network architecture application between servers sharing common peripherals.
COM+	An extension to the Component Object Model (COM). COM+ builds on COM's integrated services and features, making it easier for developers to create and use software components in any language, using any tool.

Terms	Definitions
Confirmation Message	Message usually appearing on the process window to confirm the execution of a function or a program.
Console	On microcomputer Unix boxes, the main screen and keyboard (as opposed to character-only terminals talking to a serial port).
Contact Person	A representative of an Actor created in the context of a Port. Each Actor must provide one to three Contact Persons (a minimum of one is required).
Data	Numbers, characters, images, or other method of recording, in a form that can be assessed by a human or (especially) input into a computer, stored and processed there, or transmitted on some digital channel. Computers nearly always represent data in a binary form.
Data File	Any file or document created within an application (e.g., a word-processing document, spreadsheet, database file, or chart).
DB	Data Base
DNS	Domain Name Server
Domain	A group of computers whose hostnames share a common suffix called the "domain name".
DS1	Digital Signal 1. A level and framing specification for synchronous digital streams, over circuits in the North American digital transmission hierarchy, at the T1 transmission rate of 1 544 000 bits per second (baud).
eAssist Global Solutions	Newest solution offers by BCE Emergis to manage customer service calls.
EDI	Electronic Data Interchange. The exchange of standardized document forms between computer systems for business use.
Empty Memo Instruction	Instructions to handle information related to Empty Containers.
Encryption	Any procedure used in cryptography to convert plaintext into unclear text to prevent anyone but the intended recipient from reading that data.
EDA	Estimated Date of Arrival
EDD	Estimated Date of Departure
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
Extranet	The extension of a company's Intranet out onto the Internet (e.g., allows selected customers, suppliers, and mobile workers to access the company's private data and applications via the World Wide Web).
FireWall	A dedicated gateway machine with special security precautions, used to service outside network, especially Internet, connections and dial-in lines. Its purpose is to protect a cluster of more loosely administered machines hidden behind it from hackers.
Frame	A datalink layer 'packet' that contains the header and trailer information required by the physical medium. Network layer packets are encapsulated to become frames.
Front-End	An intermediary computer that does set-up and filtering for another (usually more powerful but less user-friendly) machine (see Back-End).
FTPS	File Transfer Protocol Secured. A protocol that describes how one computer can host other computers to allow the transfer of files in either direction.
FW	Firewall
Hack	To gain access illegally to government or business data.
Hardware	The equipment that makes up a computer system.

Terms	Definitions
Heat	Software designed to manage customer service calls.
Help Desk	Administrative entity responsible for after-sales service and technical support.
Hostname	An Internet hostname is an ASCII string (e.g., "foldoc.doc.ic.ac.uk" that consists of a local part (foldoc) and a domain name (doc.ic.ac.uk).
HSRP	Hot Standby Routing Protocol
HTML	Hyper Text Markup Language. A hypertext document format used on the World Wide Web.
HTTPS	HyperText Transfer Protocol Secured. The client-server TCP/IP used on the World Wide Web for the exchange of HTML documents. It conventionally uses port 80.
Hypertext	Hypertext provides a method for presenting text, images, sound, and videos that are linked together in a nonsequential web of associations.
ICMP	Internet Control Message Protocol
IE	Internet Explorer
IEEE	Institute of Electrical and Electronics Engineers
IIS	Internet Information Server. IIS is intended to meet the needs of a range of users: from workgroups and departments on a corporate Intranet to ISPs hosting web sites that receive millions of hits per day.
Initial Carrier	In the Bill of Lading sent by the Shipping Line, each Container may contain information to specify the carrier.
Instruction to Truck Driver	Process used by the Trucking Company to match an Order to Carrier with a truck driver.
Internet	Regrouped network computers sharing information using a common protocol.
Intranet	Any network that provides similar services within an organization to those provided by the Internet but which is not necessarily connected to the Internet. The most common example is the use by a company of one or more World Wide Web servers on an internal TCP/IP network for distribution of information within the company.
ISP	Internet Service Provider
KBPS	KiloBytes Per Second
Kerberos	The authentication system of MIT's Project Athena. It is based on symmetric key cryptography.
Kernel	The kernel is the set of functions that make up the operating system; used to provide an application interface between programs and the underlying virtual and physical devices.
LDAP	Light Directory Access Protocol
Load-Balancing	Techniques that aim to spread tasks among the processors in a parallel processor mode, to avoid some processors being idle while others have tasks waiting for execution. Data processing is therefore spread out depending on processor availability.
Logon	To establish a connection with the network and identify oneself to the network operating system.
Mail	Messages automatically passed from one computer user to another, often through computer networks and/or via modems over telephone lines.
MBPS	MegaBytes Per Second
Monitoring	Process to track system event.
Name	The Name of an Actor, in any given language, ensures that critical attributes can be kept/displayed in more than one language.

Terms	Definitions
Network	A group of computers connected by cables or other means and using software to enable them to share printers, disk drives, and information.
NIC	Network Interface Card
NLB	Network Load Balancing
NNM	Network Node Manager
Node	On a LAN, a device that is connected to the network and is capable of communicating with other network devices. For example, clients, servers, and repeaters are called nodes.
NTLM	NT LAN Manager. Microsoft Windows NT Challenge/Response authentication.
Operating System	(OS). Low-level software that handles the interface to peripheral hardware, schedules tasks, allocates storage, and presents a default interface to the user when no application is running.
Order to Carrier	Process performed by the Freight Forwarder to assign a transportation request to a specific Carrier. A Carrier can be a Trucking Company or a Railroad Carrier. The Order to Carrier tells the Carrier what to pick up, from where, to where, and whether special equipment is needed.
OU	Organizational Units
Packet	A block of data sent over the network that includes the identities of the sending and receiving stations, error-control information, and a message.
Parameter	Utility table that contains parameters related to reports. The structure and columns must be reviewed during the development phase.
POM	Port of Montreal
Protocol	A set of rules that define how computers communicate.
Q/A	Quality Assurance
RAD	Rapid Application Development. A loose term for any software life-cycle designed to give faster development and better results, and to take maximum advantage of recent advances in development software.
RAID	Redundant Array of Inexpensive Disks
Redundancy	The provision of multiple interchangeable components to perform a single function in order to cope with failures and errors.
Referenced Domain	List of the domains that are referenced by some attributes. A domain is attached to one or more attributes of the Extranet database.
Replication	Creating and maintaining a duplicate copy of a database or file system on a different computer, typically a server. The term usually implies the intelligent copying of parts of the source database that have changed since the last replication.
Repudiation	In cryptosystems, the denial by one of the entities involved in a communication of having participated in all or part of the communication.
RFC1918	Address Allocation for Private Internet
Rights	Authorization with which a user is entitled to perform certain actions on a computer network. Rights apply to the system as a whole, whereas permissions apply to specific objects.
Root	The Unix 'superuser' account (with user name "root" and user ID 0) that overrides file permissions.
Router	An interconnection device that is similar to a bridge but serves packets or frames containing certain protocols.
Secured Tunnel	A method to transmit data between administrative domains that use a protocol not supported by the internet connecting them.

Terms	Definitions
Server	A computer that provides some service for other computers connected to it via a network.
Service Provider	A company that offers services to users, usually for a fee.
SLA	Service Level Agreement
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
Software	A set of instructions loaded into a computer to make the hardware perform tasks. Programs, operating systems, device drivers, and applications are all software.
SQL	Structured Query Language
SSL	Secure Socket Layer. A protocol designed by Netscape Communications Corporation to provide encrypted communications on the Internet.
SSO	Single Sign-On
Standalone	Capable of operating without other programs, libraries, computers, hardware, networks, etc.
Standard Suborder	Represents the assignment of a work order to a Carrier concerning a unit existing in the database. Each assignment contains the details of the operations the carrier must perform.
STRIDE	Spoofing, Tampering, Repudiation, Information disclosure, Denial of service, Elevation of privilege
Subinstruction	A Subinstruction contains one of the units involved in the instruction.
Switch	A communications paradigm in which packets are individually routed between nodes, with no previously established communication path.
Synonym	A way to ensure that the Actor's name received from external files (e.g., EDI files) can be interpreted by the Extranet.
T1	An AT&T term for a digital carrier facility used to transmit a DS1 formatted digital signal at 1.544 MBPS.
TCP/IP	Transmission Control Protocol/Internet Protocol. A set of communications protocols that has evolved since the late 1970s, when it first was developed by the U.S. Department of Defense (DOD).
Telecom	Techniques allowing the transmission of any kind of data through different protocols, between various distant devices.
TIR	Terminal Interchange Report
TLS	Transport Layer Security
Translator	Software used to translate application codes from one language to another.
Truck Driver	Exists only in the context of a Carrier (Trucking Company), which itself only exists in the context of a Port. A Truck Driver is assigned to perform an instruction.
Unit	Although the term Container is widely used in the Port area, the word Unit is preferred for the purposes of this report. Containers, semitrailers, and other shippable components are considered to be intermodal units.
Unit Events	Displays the current state of a Unit: on board a Ship, grounded, held or released (e.g., by Customs), in-gate or out-gate from the Terminal, or ramped. The purpose of Unit Events is to establish the current status of the Unit in the Extranet so that the various Actors know when to perform their tasks.
Unit Summary	Contains the static part of a unit's information when that unit is created in the Extranet database. The information comes from the Bill of Lading on which the unit is declared. Generally, the changes that occur to an event are reflected in

Terms	Definitions
	the actual event entity.
Unix	A multitasking, multiuser operating system for microcomputers that was developed by AT&T and has enjoyed popularity among engineering and technical professionals.
Uptime	Time when the services (hardware and software) are available.
URL	Uniform Resource Locator. A standard way of specifying the location of an object, typically a web page, on the Internet.
Value Description	Each Value code must have one or more descriptions by language.
VAN	Value Added Network. Communication network that sends improved information by insuring, for example, the management and follow-up of the files being sent.
Vessel	A ship that berths at one of the Port's Terminals.
Vessel ID	Name of the Vessel.
VLAN	Virtual Local Area Network
Voyage	The movement of ships from one port to another.
Voyage Number	Each vessel arrival at a Port Terminal corresponds to a unique voyage number. The departure of each vessel from a Port Terminal corresponds to another unique voyage number.
VPN	Virtual Private Network. A privately owned packet-switched network whose services are sold to the public.
Web	The Web is the World Wide Web (WWW).
Web Browser	A program that allows a user to read hypertext. It provides some means of viewing the contents of nodes (or pages) and of navigating from one node to another (Internet).
Web Site	Any computer on the Internet running a World Wide Web server process. A particular web site is identified by the hostname part of a URL.
XML	eXtensible Markup Language. Evolution of the SGML language allowing writers of HTML documents to define their own targets in order to personalize the structure of the data presented.

1 INTRODUCTION

This report was prepared in response to Transport Canada's requirement to provide the Port of Montreal community with a design specification for an Extranet system.

The Transportation Development Centre (TDC) and the Port of Montreal have joined forces on an intermodal technology project designed to improve the efficiency and productivity of container movement through the Port. This project is part of a larger program designed to achieve fully integrated business document exchange among the port's trading partners/stakeholders. The program involves the implementation of Internet-based technology linking the Port and its major trading partners.

In this context, it has been decided that an Extranet for the Port of Montreal community would be developed. BCE Emergis was contracted to define the detailed specifications required to build this Extranet. These specifications are based on recommendations established in the report TP13531E conducted by GE Information Services Canada.

In recent years, the Port of Montreal has conducted several studies to become more competitive and productive, mostly by improving both its incoming and outgoing Container movement. These studies have identified several problems related to Container handling. Congestion at the Terminal gate, caused mainly by incorrect or missing container information, was the most critical problem identified.

The Port of Montreal Extranet design will allow its members to improve their overall efficiency, especially in the area of gate congestion and truck terminal interface. Key areas of improvement by the implementation of this Extranet are:

- Improved services to community members and potential end users;
- Continuous container visibility to all members with appropriate user access;
- Expanded community participating in the use of electronic commerce;
- Reducted waiting times at the gate;
- Improved and efficient communication among all members;
- Fewer data entry errors and paperwork inaccuracies.

This report is a clearly specified design document to be used by the Port community in the implementation of the Extranet system. It also includes sufficient details to be used by developers to code and create a web application.

The design covers the following topics:

1. **Architecture:** General system and network architecture design that defines required equipment and networking capabilities for the Extranet including:
   - Hardware and software;
   - Telecommunications networks.
2. **Application:** System design that includes:
   - User web interfaces for container inquiry screens accessible through the Internet. Five types of user interfaces are associated with five partner types:
     - Shipping Lines;
     - Freight Forwarders;
     - Terminals;
     - Trucking Companies;
     - Government.

- Facilities for various stakeholders (Shipping Lines, Freight Forwarders, Trucking Companies and Terminals) to provide information to the Extranet through web screens or batch transactions;
- Facilities for Trucking Companies to download information from the Extranet.

3. **Database:** System design that includes functional requirements for a central database that will hold and maintain all information related to containers that may be useful to implied stakeholders.

4. **Security** guidelines for the Port of Montreal Extranet.

5. **Operations/Service Level Agreement** definition that includes roles and responsibilities to provide the highest quality of service for the Extranet.

The Port of Montreal Extranet is designed to evolve easily. At the end of this report, a list of future enhancements is given, which is not a limitation of how the Extranet should evolve, but ideas on how it may evolve.

2 ARCHITECTURE

This section of the report describes the infrastructure aspects of the Port of Montreal Extranet System by presenting the various networks and components required to achieve its functionality.

It details, from a hardware and software standpoint, the nature and particularities of the various components of the solution, and provides an estimate of the costs involved in building the Extranet according to the specifications outlined in this report.

2.1 Description of the Solution

2.1.1 Overview

This Extranet solution is intended to supply the Port of Montreal community of users with real-time access to the latest information on container status and availability, in order to enhance productivity of the overall container conveying system, the main bottleneck now being the container pickup at the terminals by truck drivers.

Setting up a successful Extranet depends on many factors ranging from administrative to political. Technical factors are the most easily controlled aspects of the whole chain. This design document covers all aspects of an Extranet solution, whether entirely hosted by BCE Emergis or the Port of Montreal and, if the need should arise, that would include a Help Desk and Business Office functions.

Although these functions as well as other Extranet functions could be outsourced, the infrastructure of the current solution assumes that all functions are to be implemented on the premises, and that costing must initially be provided for the entire system, all functions included.

2.1.2 Requirements/Constraints

Service Level Requirements:
The Port of Montreal Extranet Service Level Agreement should have the following characteristics:

- 24x7 availability and monitoring;
- 98.5% uptime;
- 8:00 to 18:00 Business Office hours;
- 24x7 Help Desk.

Should a higher level of availability and extended hours of technical support be required in later stages of the project, availability could be enhanced by clustering or load-balancing standalone servers, and by adding personnel to the Help Desk.

The architecture is therefore thought of in terms of expandability, should the need for growth or added service availability arise.

Performance Requirements

Accurate performance will be easy to achieve. For that reason, outstanding performance has not been identified as a key element for the success of the Port of Montreal Extranet.

Because of the rather small and closed community of interests in the Port of Montreal Extranet, at least in its initial stage, and because of the small amount of transactions, it is easily foreseeable that small to medium systems should suffice for the basic requirements in terms of performance.

The community of interest members and the number of users per community has initially been identified as shown in Table 1:

Community	Estimated number of members (max.)	Number of users (maximum)	Total
Shipping Lines	12	4	48
Terminals	3	4	12
Freight Forwarders and Custom Brokers	25	4	100
Trucking Companies	25	4	100
Total	65	4	260

Table 1 Estimated Number of Community Members

These rather low numbers also justify the choice of telecommunications equipment and bandwidth required. Where continuous access, and therefore high availability of the Internet feed, is desirable and a key factor for the stakeholders, an average-to-good response time (i.e., between 2 and 5 seconds) should be sufficient to encourage Extranet users to continue using it to retrieve information.

The Internet feed should therefore be redundant, but a fractional T1 (256KBPS - 512KBPS) should be enough to provide users with reasonable performance. Having T1 equipment will enable upgrading to 1.5MBPS, should the growing success of the Extranet require it.

Security Requirements

While the information conveyed through the Port of Montreal Extranet is not considered classified or highly confidential, security measures must be put in place to control access and disclosure of this information to authorized parties only.

Various groups of business partners are involved in the Extranet, and improper or unauthorized access could have undesirable business consequences. A hierarchical structure is therefore necessary to group the different access families. A strictly controlled single logon gives network access only to authorized participants, and within the network, grants application and data access by applying strict business rules.

The security access control process is based on Windows 2000 Active Directory Server Technology, and SSL encryption ensures data confidentiality.

Making the Port of Montreal Extranet publicly available on the Internet is a desirable feature from an economics standpoint, but improper network security could lead to unwanted intrusions, causing some political damages that could ruin the credibility of the Extranet. The importance of implementing strong security measures should therefore not be underestimated.

Sizing Requirements

The sizing requirements of the Port of Montreal Extranet hardware and equipment are based on the observed traffic of at most 1,000,000 containers transiting the port each year.

It is estimated that about 20Kb of information is kept about each container, which means that 20Gb of storage would be required to keep yearly data on containers, as well as a few extra Gigabits of storage to keep data on an Extranet community of about 300 users.

Data capacity is therefore not a big concern, and small-to-medium capacity systems should be more than sufficient in terms of processing and storage to service the Port of Montreal Extranet community.

Cost Considerations

The intent of this report is to examine closely all aspects required to set up a successful Extranet. Budget considerations have therefore not been taken into account to allow full coverage of the infrastructure requirements.

The suggested infrastructure, however, is such that some parts of the Extranet might be outsourced, or shared to lower the set-up and exploitation costs.

Availability, security, and performance requirements leading to certain choices of hardware may also be revised if a decrease in the overall cost is needed.

Generally speaking, this suggested Extranet infrastructure aims to be a highly adaptable architecture that may grow and expand easily with future needs, or be scaled down, in a first phase, by integrating multiple functions instead of using dedicated servers.

2.1.3 Infrastructure

The Port of Montreal Extranet described herinafter is a secure and highly available network, featuring the latest technology to better serve its users. Based mainly on Windows 2000 technology with ADS for resource control and access, it offers an integrated solution for user management along with security features that may be used at both the application and data levels.

This solution presents five different networks corresponding to various levels of two service networks. The network is entirely switched for speed and security, and offers two levels of firewall to ensure data protection.

Cisco and Nortel equipment are used for telecommunications and, because of their reliability, Sun hardware and a UNIX operating system are used for firewalls and console. HP hardware with an HP-UX operating system using HP OpenView Vantage Point software is used for monitoring.

The core system is an all Windows 2000 solution on Compaq hardware, offering the following advantages: ease of administration, widespread technology, and seamless integration of the different components.

Description of the network(s)

Access Network

The Port of Montreal Extranet access network consists of telecom equipment linking the Port of Montreal Extranet to the Internet via high-speed links to Service Providers. It is not a trusted network.

High availability is achieved by doubling the connection to the Internet and by using two different Service Providers to ensure availability of service to the Internet for the Port of Montreal Extranet community.

Screened Network

This is the Port of Montreal Extranet front-end network. It consists of the Web servers, the authentication server, and different network services like mail and timeservers.

It is called a screened network because it is protected by the external firewall that performs screening to allow access only to authorized traffic.

Because the web site is the Port of Montreal Extranet point of contact and to ensure service continuity, native Windows 2000 NLB is used, which can accommodate up to 32 web servers. In this solution, two web servers are used to maintain availability and performance.

Most stakeholders will go through the Web-SSL interface to access the Port of Montreal Extranet, whether it be for updates or queries to the database. HTTPS uploads and queries are simple mechanisms from which information can easily be obtained or deposited on a common data repository.

The external ADS is responsible for the logon process and for the propagation of the access control to the IIS server, and subsequently to the database. Replication may occur with the internal ADS, which also serves the purpose of redundancy.

Internal Network

This is the Port of Montreal Extranet front-end server's private connection network to the back-end. It adds an extra level of security to ensure that no direct connection takes place between Internet-connected interfaces and application servers. Routing is disabled on servers.

This network is not addressable from the Internet, since private addresses (RFC1918) are used for the addressing scheme. Backup and monitoring of the front-end servers are also performed through this network.

The web servers communicate with the application network through the internal network.

Application Network

This is the Port of Montreal Extranet core or back-end network, where all the business rules and data used to publish valuable information pertaining to each group of stakeholders reside.

It holds an internal copy of the ADS for security and redundancy, but mainly, it holds the Port of Montreal Extranet database, which contains all the necessary information. It is an SQL 2000 database configured in a cluster to provide data access reliability.

A transaction server acts as an intermediate between the web servers and the database requests for performance and security.

A universal translator allows for database updates from EDI files to XML format supported by the database. This translator is the Windows based translator, Biztalk 2000.

This applicartion network dials a VAN at a fixed time interval to fetch copies of EDI transactions for which the Port of Montreal is carbon-copied.

The presence of a modem in this secure zone of the network may seem like a security threat, but the VAN connections are connected to private networks, and traffic goes from the Extranet to the VAN (i.e., outbound traffic only).

For a more reliable connection to the VAN network, a dedicated link could be considered, allowing VAN access to be shared among different servers if needed. The dedicated connection could enter through the external firewall, ensuring a single point of access to the network.

Other updates of the database are achieved by uploading text files (or other format files) using the web interface (HTTPS and FTPS uploads). The translator polls the web servers on a regular basis for new update files, which are then applied to the database by the transaction server.

Application Service Network

This is the Port of Montreal Extranet back-end servers' private connection network to the secure and management networks. It adds to performance and security, ensuring that application-related communications are not mixed with management and/or reporting data.

This network is not addressable from the Internet, as private addresses (RFC 1918) are used for the addressing scheme. Backup and monitoring of the back-end servers are also performed through this network.

Secure Network

The Port of Montreal Extranet secure network is where all the logging, reporting, and monitoring of the network take place.

It is a highly secure environment that can only be accessed locally, or through VPN access from the management network. Firewall management should always be performed locally to ensure network integrity.

This network is not addressable from the Internet, as private addresses (RFC 1918) are used for the addressing scheme.

Management Network

The Port of Montreal Extranet management network manages the network and the servers.

It is a highly secure environment that can only be accessed locally, or through a VPN connection from authorized Internet sources, such as a remote Help Desk or Business Office.

The VPN concentrator is a hardware device allowing connections from the Internet to be directed to the management network in a secured tunnel, making authorized remote users appear as local. Outbound communication from the management or secure network toward the access network or the Internet is only possible if the VPN concentrator device also supports routing.

The idea of this network is to support local or remote administration in a secure fashion.

The Help Desk ticketing system is hosted in this network.

Other Networks

Development and Q/A Environments

A development environment and a Q/A environment are also part of the Port of Montreal Extranet solution.

The development environment must allow thorough testing of all possible situations that may arise during the development cycle. For this reason, it should imitate the production environment as close as possible and include all major functionalities of the core system, as well as reproduce the networking environment as accurately as possible. This will be the case if no laboratory is available for testing. If a laboratory is available, there is no need for redundant servers and clusters, and the development environment may be stripped down.

The Q/A environment will ensure that anything that is about to go into production has been passed thoroughly through a stable environment. For this reason, it is more important for the Q/A environment to be stable than for it to reproduce the production environment exactly. It may consist of scaled-down systems, and functionalities may be shared on the same server. Clustering and high availability are no longer strict requirements.

The core systems that need to be included in both the Q/A and development environments of the Port of Montreal Extranet are the web server, the database server, the transaction server, the translator, and two Active Directory Servers (one external and one internal) to enforce the production environment security model. The translator could be shared between the Q/A and development environments, as could the external and internal Active Directory Servers, should both environments be colocated. The transaction server could be located on the Web Server in the Q/A environment.

The Q/A environment consists of two servers: one web and transaction server, and one database server. The translator and the internal and external Active Directory Servers will be located in the development environment, but available to the Q/A through the Q/A and development firewall. A single network segment is required.

The development environment consists of two load-balanced web servers, two clustered database servers, one transaction server, one translator, and two Active Directory Servers. To imitate the production environment, three network segments are required: screened, internal, and application. It is therefore recommended to use a distinct switch for the Q/A and development environments, and to segregate both environments using a firewall.

All support, reporting and monitoring functions may be excluded for the development and Q/A environments.

Both environments could be entirely separated from the production network as long as detailed and thoroughly tested procedures exist to update versions from development to Q/A, and from Q/A to production. They could also be linked to the internal firewall, as illustrated on the network diagram.

Network Diagram

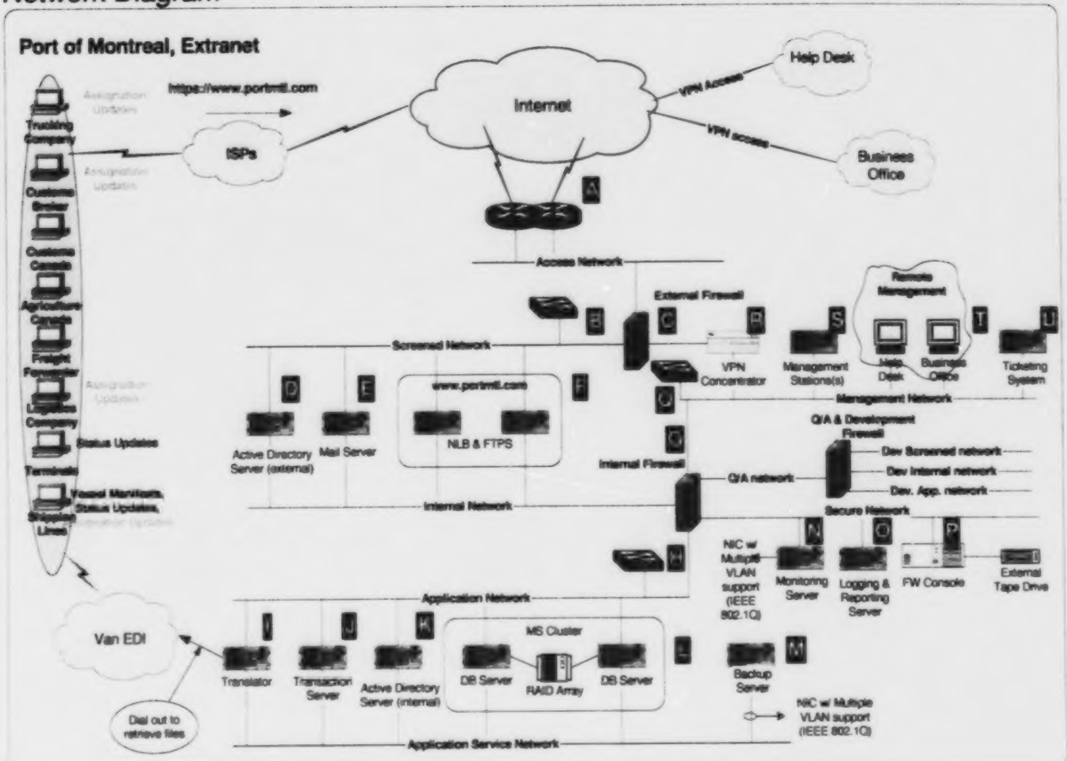

Port of Montreal, Extranet
https://www.portmtl.com
Assignation Updates
Trucking Company
Assignation Updates
Customs Broker
Customs Canada
Agriculture Canada
Freight Forwarder
Assignation Updates
Logistics Company
Status Updates
Terminals
Vessel Manifests, Status Updates, Assignation Updates
Shipping Lines
ISPs
Internet
VPN Access
Help Desk
VPN access
Business Office
A
Access Network
B
External Firewall
C
R
S
Remote Management
T
U
Screened Network
VPN Concentrator
Management Stations(s)
Help Desk
Business Office
Ticketing System
D
E
www.portmtl.com
F
G
Management Network
Active Directory Server (external)
Mail Server
NLB & FTPS
Q/A & Development Firewall
Dev Screened network
Dev Internal network
Dev. App. network
Internal Firewall
Q/A network
Internal Network
Secure Network
N
O
P
NIC w/ Multiple VLAN support (IEEE 802.1Q)
Monitoring Server
Logging & Reporting Server
FW Console
External Tape Drive
H
Application Network
Van EDI
I
J
K
MS Cluster
L
M
Translator
Transaction Server
Active Directory Server (internal)
DB Server
RAID Array
DB Server
Backup Server
Dial out to retrieve files
NIC w/ Multiple VLAN support (IEEE 802.1Q)
Application Service Network

Figure 1 Network Diagram

2.2 Description of the Components of the Solution: Hardware and Software

As stated in section 2.1.3, Cisco and Nortel equipment are used for telecommunications needs. Sun hardware and UNIX operating systems are used for firewalls and console because of their reliability. HP hardware with HP-UX is used for monitoring purposes.

The core system is an all Windows 2000 solution on Compaq hardware, offering the following advantages: ease of administration, widespread technology, and seamless integration of the different components.

Note: The following description does not specifically cover the components of the Q/A and development environments, their functions being the same as in the production environment. The required hardware for the Q/A and development environments is described in detail in Appendix C.

2.2.1 Switches

A minimum of three layer 2 switches is required to achieve adequate security and redundancy for the Extranet. A fourth switch (model 2948) could be provided as a cold backup for any of the three other switches.

Configuration, administration, and logging of the switches traffic may be done using CiscoWorks 2000 Lan Management Solution software that would be located on the logging and reporting server in conjunction with the HP OpenView software on the monitoring server.

The logging of the Contivity switch may also be achieved using Cisco Works software and HP OpenView.

Layer 2 Switch – Screened Network

Diagram reference letter: 'C'

- Cisco 24 ports enterprise switch supporting 100MBPS (model 2924, for example)
- High-performance layer 2 switching:
  Configuration of the external VLANs: access network, and screened network;

Layer 2 Switch – Application Network and Other Internal Networks

Diagram reference letter: 'H'

- Cisco 48 ports enterprise switch supporting 100MBPS (model 2948, for example);
- High-performance layer 2 switching:
  Configuration of the internal VLANs: internal network, application network, application service network, and secure network.

Layer 2 Switch- Management Network

Diagram reference letter: 'Q'

- Cisco 24 ports enterprise switch supporting 100MBPS (model 2924, for example);
- High-performance layer 2 switching:
  Configuration of the management VLAN: dedicated management switch.

VPN Concentrator

Diagram reference letter: 'R'

- Hardware device used to secure a communication channel by establishing a secured tunnel between remote authorized users and a management network;
- Requires some CPU power and a hardware accelerator to achieve reasonable performance;
- Should Internet access or access to the access network be required from the management or secure networks, routing capability would be required in the device. Combined with ACLs, this solution would conform to the security policy of this Extranet solution.

2.2.2 Routers

Routers provide redundant access to the Extranet for the Port Community. Fractional T1s from 256KBPS are sufficient to satisfy required performance needs. Since access lists are configured and require some parsing, entry level to medium-sized routers should be sufficient.

A model such as the 2621 with dual Ethernet interface could be used.

Redundant Border Routers

Diagram reference letter: 'A'

- First level of network and access security;
- Filters on addresses and protocols;
- Generate logs and/or alarms for forbidden accesses;
- Run BGP4 as the routing protocol;
- Run HSRP for high availability.

2.2.3 Firewalls

Check Point stateful inspection firewall software (FireWall-1) is the solution chosen for this, mainly for its ease of use and deployment, as well as for its extended logging capability. All the firewall logs are sent to the firewall console located on the secure network. Paging or other types of alerts may be enabled for unwanted access, if the need should arise.

SUN Netras are excellent machines to serve as firewalls. The hardware is very resistant, built for telco installations, rack-mounted, and slim. It runs Solaris Operating Software, which is known for its stability.

Extremely high availability could be achieved by doubling the servers and adding specialized software like Stonebeat or Rainwall to allow load balancing and failovers between two firewalls in the same cluster. In this solution, there is provision for only one external and one internal firewall, each equipped with an extra disk for cold backup recovery in case of failure.

The firewall console containing all the traffic logs has its own tape backup device for increased security. Reports on firewall traffic may be generated by a specialized module available for the WebTrends software that runs on the Logging and Reporting server 'O'.

External Firewall

Diagram reference letter: 'B'

- Second level of network and access security;
- Stateful Inspection firewall (Check Point FireWall-1);
- Filters on addresses and protocols;
- Allows FTPS and HTTPS connections from the Internet;
- Allows SMTP connections to and from the Internet:
    - Allows remote administration VPN connections by routing to the VPN concentrator;
    - UNIX operating system and SUN hardware for robustness;
    - Cold backup external device for redundancy.

Internal Firewall

Diagram reference letter: 'G'

- Fourth level of network and access security;
- Stateful Inspection firewall (Check Point FireWall-1);
- Filters on addresses and protocols;
- Protects internal:
    - Allows connections from the internal network, the management network and the secure network for monitoring, reporting, and backup;
    - Allows connections to the application network for updates and queries from the web servers;
    - UNIX operating system and SUN hardware for robustness;
    - Cold backup external device for redundancy.

Firewall Console

Diagram reference letter: 'P'

- Check Point FireWall-1 console;
- Repository for firewall rules and logs to distribute across the network:
    - UNIX operating system and SUN hardware for performance and reliability;
    - External backup device for security.

2.2.4 Servers

Most servers are provisioned using the same configuration, except for the database and backup servers. They are all Compaqs running Windows 2000 and other Microsoft applications. They come configured with dual CPUs to ensure performance with SSL transactions and ADS traffic, and to ensure the same kernel is used throughout the Port of Montreal Extranet.

Because they all have the same configuration, the servers may host multiple applications, should the need arise (e.g., in the case of a motherboard failure).

The database and the backup servers are defined with two slightly different configurations. The database server needs to share disks between two servers for availability, thus requiring an external array of disks. The backup server requires a special network interface card connected to the switch that allows access to, and therefore backup of, all VLANs configured on that switch.

Since the web servers constitute the main access or entrance to the Extranet, they are set up in a load-balancing, fault-tolerance configuration using Windows 2000 NLB. More than two servers could be used.

Monitoring, logging, and reporting servers are essential functions of the Extranet. They are responsible for measuring the Port of Montreal Extranet's success by collecting data on its availability, failures, response times, queries, and activity. In the case of a hardware failure, all functions could be run on the same server, with some reconfiguration.

Industry leaders such as WebTrends and HP OpenView are the recommended software for reporting and monitoring, along with an SQL database to replicate data, generate custom reports and, store cumulative data.

Active Directory Server - External

Diagram reference letter: 'D'

- Responsible for the logon process;
- Single logon for the whole network;
- Third level of network and access security;
- Links to application and data level security mechanisms;
- Three components: external DNS, Global Catalog, and
  - Domain Controller;
  - May replicate to internal ADS for redundancy;
  - Requires IE browser for stakeholders to allow for Windows 2000 authentication;
  - Requires Windows 2000 on the administrators workstations to allow delegate authority feature.

Mail Server (SMTP)

Diagram reference letter: 'E'

- Mail communication between Port of Montreal Extranet stakeholders;
- Mail notification for Extranet monitoring;
- Replication of the ADS data.

Web Servers

Diagram reference letter: 'F'

- Windows 2000 Advanced Servers;
- IIS v5 servers load balanced using NLB;

- Receive queries and updates from the different stakeholders and partners in a Web-based interface;
- Load balanced for availability and performance;
- SSL-enabled communication to ensure data privacy;
- FTPS services to receive flat files;
- User Authentication assured through the use of an ADS thus alleviating the need to maintain a local database of users.

Translator

Diagram reference letter: 'I'

- File Format Translator (XML, EDI, comma-delimited file);
- Biztalk 2000 server;
- Provides an IIS/ASP interface to allow HTTP uploads;
- Multiple methods for input and output;
- Easy integration with Microsoft suite of products;
- Easy interface for map creation.

Transaction Server

Diagram reference letter: 'J'

- Controls and applies business rules;
- Triggers all connections to the database servers;
- Offers an extra level of security at the application layer, if on a separate machine;
- Part of the Microsoft model for electronic commerce.

Active Directory Server - Internal

Diagram reference letter: 'K'

- Responsible for the logon process of internal and administrative users of the Extranet;
- A backup of this instance of the ADS may be located on the transaction server (J);
- Consists of three components: internal DNS, Global Catalogue and Domain Controller;
- May be used for partial replication of the external ADS for redundancy;
- May serve as the internal timeserver, to be synchronized with the border routers.

Database Servers

Diagram reference letter: 'L'

- SQL 2000 redundant servers with an optic fibre connected array of external disks for data availability running on Windows 2000 Advanced Server;
- MS Cluster used for clustering;
- RAID-5 for performance and data availability;
- Highly secured data repository of the Extranet;
- Extranet user tables, data entities;
- Easy integration to the access control mechanism of the Extranet and to the Microsoft suite of products.

Backup Server

Diagram reference letter: 'M'

- Creates daily backups of all servers of the Port of Montreal Extranet (except the management network) using Veritas Backup Exec;
- Specialized agents allow for backups of live SQL and Exchange databases;
- Equipped with a network interface card capable of supporting multiple VLAN access (IEEE 802.1Q protocol) which allows it to span across all VLANs created on the internal switch, thus allowing backup of the internal network, application service network, and secure network;
- Copies of the backup should be kept off site to ensure smooth recovery of the data in case of a disaster.

Monitoring Server

Diagram reference letter: 'N'

- Collects usage information on the various servers;
- Runs on HP-UX / HP hardware;
- Monitors the various Extranet servers using agents (installed or native) on the servers and a central server to generate alarms and create reports;
- May be equipped with a network interface card capable of supporting multiple VLANs access (IEEE 802.1Q protocol);
- HP OpenView, the recommended software, requires a fair amount of expertise to set up, but it allows monitoring and information gathering for many different platforms, including switches and routers. Vantage Point and Network Node Manager (NNM) are the basic modules to be put in place;
- Custom scripts will have to be written to specifically monitor the Port of Montreal Extranet's functionality.

Logging and Reporting Server

Diagram reference letter: 'O'

- Collects usage information on the various servers;
- Central repository for logs of all servers;
- Generates reports and analyzes logs using tools like WebTrends for the web servers and the firewalls; features Access database for gathering information on the Extranet's ongoing operations;
- The Port of Montreal database reports may be generated by replicating the related database files to the reporting server, and running custom reporting scripts that will provide useful information on Extranet usage;
- Switches and routers traffic may be analysed using CiscoWorks on the generated syslog files.

Management Station(s)

Diagram reference letter: 'S'

- Allows maintenance and monitoring of the different servers in the Port of Montreal Extranet system for version upgrades, patches installation, etc.;

- Windows 2000 workstations are required to allow ASD logon process and delegate authority feature.

Remote Management

Diagram reference letter: 'T'

- Help Desk and Business Office may be outside of the Extranet system, but through VPN access, they will appear as local to the management network;
- Help Desk will assist Port of Montreal Extranet users by providing support on accessing the Extranet, troubleshooting unsuccessful connections, reporting problems, etc.;
- Business Office will participate in the Extranet providing users management, partner enrolment, etc.

Ticketing System

Diagram reference letter: 'U'

- Help Desk and Business Office need a ticketing system to log error tickets, system disturbances, user calls, etc.;
- The ticketing system consists of a database of logged problems with date and time of opening and closing, as well as the related escalation process to solve the issue;
- At the beginning, a simple ticketing system like the Heat system could be put in place. With the growing popularity of the Extranet and its community, a more sophisticated service could be deployed offering integrated services like on-line help, chat, and portal. The software provided by eAssist Global Solutions could then be considered an integrated solution.

2.3 Network Services

This section describes various services to be made available to the different networks constituting the Port of Montreal Extranet, in order to ensure its integrity, security, and smooth operation.

2.3.1 Naming Service

The naming service refers to the mechanism used in a given system to access the system's objects.

The naming service strategy adopted for the Port of Montreal Extranet is based on Windows 2000 Active Service Directory.

The ADS consists of three components: a DNS component, a Global Catalogue, and a Domain Controller.

Two distinct ADS instances are to be put in place: an external directory (slave) and an internal directory (master). Some replication will be allowed from the internal toward the external, but not the other way around. Secondary instances of the external and internal servers may be deployed to ensure data availability, as full replication is allowed between two external instances and between two internal instances.

All data pertaining to objects of the access network and the screened network (host names or services, for example) would be stored in the external DNS, Domain Controller, and Global Catalogue of the external ADS.

In the same fashion, all data pertaining to the internal network, the secure network, the application network, the application service network and the management network will be stored in the internal ADS.

Should traffic become very important with the VPN concentrator and remote administration, a management instance of the ADS could also be used exclusively for the management network.

Segregating the naming service data allows for greater security and limits the impact of possible attacks on name servers.

2.3.2 Mail Service

The Port of Montreal Extranet mail server is used to exchange information between the different stakeholders, and to carry alerts and warnings to the Extranet Administrators.

It is located on the screened network and is not a security threat for the Extranet. Should more confidentiality be required, the data portion (database) of the Exchange Mail Server could be stored on the secure network or on the application network.

Should redundancy be needed, the external ADS could act as a backup for the mail server.

2.3.3 Time Service

A time service is of great importance to the Port of Montreal Extranet in order to allow all cooperating systems to be synchronized.

A standard time service is part of the Windows 2000 Resource Kit. This service is installed on the Domain Controllers (i.e., on the external and internal ADS).

The external time service is synchronized with the border routers that maintain an internal clock. The latter may also be synchronized to official external time sources.

2.3.4 Monitoring Service

As stated earlier, continuous monitoring of the Port of Montreal Extranet's diverse components is required to guarantee the success of the Extranet.

This is why it is recommended to use HP OpenView to gather SNMP information on all participating components from switches to servers, and transform it into manageable information through the Vantage Point (formerly ITO) module.

A single server gathers all the information collected by the various HP OpenView agents installed on the components to be monitored, and may also process information from logs such as syslog.

HP OpenView may run on either UNIX HP-UX or Solaris. Native interface is HP-UX, so it would probably be quicker to obtain updates and releases on HP-UX than on Solaris. The recommended choice is therefore HP-UX on HP hardware.

To be complete, a monitoring system must cover and report the availability of the system and its performance. It must also produce statistics and reports.

Availability

The SLA availability is evaluated in terms of service availability, but all data must be captured on the availability of the different components. Different methods, from SNMP traps to custom scripts, must be defined to allow complete reporting of the state of the service at any given time.

Alarms must be set to notify relevant administrators of an eventual system failure, either hardware- or software-bound.

Performance

SNMP counters allow for a performance evaluation of the different components, thus allowing a close follow-up to avoid service downgrading, and a close control on upgrades that may be required.

Configuration of the data collection must be set up to ensure that proper information will be gathered on resource usage for the different components. Critical resources include CPU and memory usage on servers, routers, concentrators, bandwidth on the Internet feeds, and collisions on the network.

Statistics and reports

Software like WebTrends allows for log analysis that lets one administrator study the behaviour of the users and the related response of the Web servers. A special WebTrends module is also useful to put together detailed information generated by the firewall logging mechanism.

To obtain business management reports on Port of Montreal Extranet activity and on statistics on partners' usage and access, a replication of the core database files would be set up on a daily basis between the database cluster and the reporting server. Custom-built reports, using SQL requests, could then be run on the replicated data without affecting the performance of the Extranet.

Different distribution mailing lists would be set up to allow for adequate communication of management and administrative information among the different participants of the Extranet.

The ticketing system (Heat or other) will allow the periodical generating of reports on problems reported to the Extranet over a period of time, along with resolution times and solutions applied.

Should a more sophisticated Help Desk ticketing system be adopted, such as eAssist Global Solutions software, other reports could be generated to provide detailed information on SLA observance. For more details, please refer to section 6.

2.4 Security – Architecture and Infrastructure

The multi-tiered model proposed for the Port of Montreal Extranet infrastructure offers a layered approach to security by designing regions for different levels of security and isolating the most sensitive regions as much as possible.

All components are active in the global Extranet security, as explained below.

2.4.1 Network

For a complete description of the different networks and their related definition and security, please refer to section 5.

Switches

Three different switches are required to achieve the three levels of security suggested in the infrastructure model. The external switch is used for the unsecured screened network and access network, the management switch for the management network, and the internal switch for the internal network, the secure network, the application network, and the application service network.

This way, even when using the multiple VLANs access approach for monitoring and backups, no threat is posed against the security of the different networks, since hacking one switch only gives access to its related networks. This means that hacking the external switch would only give access to the access network and the screened network.

Routers

Border routers are the first line of defence and are used to disable unwanted and unsecured traffic like ICMP echo requests or pings. They also act as choke routers, permitting only authorized traffic toward the internal networks and relieving the load on firewalls.

They filter on addresses, protocols, and ports, and may generate logs and alarms upon unwanted access.

They may be secured by applying the best practices for securing routers.

Firewalls

Two levels of firewalls are used to secure the Port of Montreal Extranet infrastructure. Stateful inspection-type firewalls provide an extra level of security compared to straight packet filtering done by routers, since they keep in-memory tables of connections along with certain knowledge of the different protocols.

Firewalls essentially restrict the traffic between the different networks to a level that is required for the good functioning of the Extranet. They generate extensive logs, which may be parsed with tools like the WebTrends module for firewalls. They also may generate alarms.

They are installed on UNIX boxes with a hardened kernel for added security.

Check Point FireWall-1 is the current market leader.

Servers

The security and system administrators, following the industry's best practices for securing servers, must install servers according to strict security guidelines they will have defined.

These include the protection of the operating system by uninstalling any irrelevant component, disabling unused services, packages, and software, and installing the required security patches as alert advisories are issued

They may also include the installation of tools to monitor the tampering of system files of which the administrators should be notified.

2.4.2 User Accesses

All Port of Montreal Extranet user access is achieved through HTTPS and FTPS exclusively. Since most access consists of queries to the Extranet, detebase updates are restricted to a few partners only.

All authorizations and access are enforced through Directory Server control. Delegation is ensured from the IIS server to the SQL server.

Users must have Internet Explorer v 5.0 as their browser to ensure proper behaviour of the ADS access control scheme.

All user sessions are encrypted immediately following the first login screen using SSL.

2.4.3 Administration

All remote administration will be performed through VPN tunnelled sessions, along with ADS access control.

Port of Montreal Extranet administrators must have Windows 2000 Workstation installed on their computers to ensure proper behaviour of the ADS access control scheme.

2.4.4 Anti-virus

To protect the Extranet, care must be taken so that all the files travelling toward the Extranet from the outside world are screened with an anti-virus mechanism.

Methods of sending files to the Extranet are through mail, via FTPS and HTTPS servers, and from the file translator connected to the VANs.

A copy of anti-virus software such as Norton Anti-Virus must be installed on each server that will receive files form the outside world. This includes the web servers, the mail server, and the translator.

A daily update of the virus definition file must be planned, as the anti-virus server resides on the Domain Controller or external ADS. All anti-virus clients then use the newly retrieved virus definition file.

2.4.5 Monitoring

Security monitoring consists of establishing controls and mechanisms to be able to determine if a system was tampered with, or if an attempt was made to hack into the Port of Montreal Extranet.

A security administrator must be in charge of regularly verifying all firewall logs to react promptly in case of an incident. A procedure for reporting and handling security incidents must be written in accordance with the Port of Montreal security procedure.

Eventually, an Intrusion Detection System could be added to the Extranet infrastructure to enhance protection.

2.4.6 Security Watch

Another task of the security administrator is to subscribe to the different Internet security alert reporting sources, like the SANS or CERT organizations, to keep abreast of the latest security threats, and to take proper measures to ensure that the different components of the Extranet are regularly updated in terms of security.

3 APPLICATION

3.1 Application Overview

In recent years the Port of Montreal has conducted several studies to become more competitive and productive, mostly by improving both its incoming and outgoing Container movement. These studies have identified several problems related to Container handling, congestion at the Terminal gate being the most critical. This congestion is caused mainly by incorrect or missing information related to Containers.

Several stakeholders are involved in Container manipulation at the Port of Montreal. There is currently no easy way for these stakeholders to share information related to Containers. Most of the time, information is transmitted by telephone or fax.
The stakeholders involved are:

- Port of Montreal;
- Shipping Lines;
- Terminals;
- Freight Forwarders;
- Trucking Companies;
- Various Government Departments.

One of the most important recommendations made by previous studies was to build an Extranet application easily accessible through the Internet and available to each stakeholders involved in Container manipulation at the Port of Montreal. The expected benefits of implementing such a system for the Port community are: less congestion at the terminal gates, minimal delays at the gates for Trucking Companies, less paperwork, improved data accuracy, real-time Container information, and better service to the customer.

In the implementation phase of the Extranet described in this document, the emphasis is put on Containers handled by Trucking Companies. If the manipulation of these Containers is improved, most of the congestion problems can be solved. In the future, functions enabling railway companies to manage Containers could also be added to the Extranet. For now, Containers assigned to railway companies will be presented in the Extranet for information and statistical purposes only.

The main objective of the Port of Montreal Extranet is to provide secure Container information to different stakeholders. Each stakeholder may only access information on the Containers it is handling. In order to see this information, users must provide valid authentication.

The Extranet application will include several screens containing a variety of information related to the Containers, and will offer information on both import and export Containers.

Each stakeholder will benefit from accurate and real-time information on Containers. To ensure a useful Extranet, each stakeholder must regularly provide Container information and share it with other stakeholders. The Extranet includes many easy ways for each stakeholder to provide its information. Batch transactions can be sent to the Extranet, since it includes a translator that accepts several formats. For those who do not have the facilities to send batch transactions, information can be sent to the Extranet through the Port of Montreal application screens.

Here is a list of functions available to stakeholders in order to provide useful information:

- Shipping Lines will "Provide Voyage Description";
- Shipping Lines will "Provide Bills of Lading", including all corresponding Containers and their descriptions;
- Freight Forwarders will "Assign Trucking Company to Container";
- Freight Forwarders will be able to "Manage Empty Memos", used mostly in the Export process to provide information on where to pick up empties and what the pickup requirements are. Booking numbers will be available to pick up empties at terminal;
- Terminals will provide the Extranet with all "Changes to Container Status", including all releases for the import process;
- Trucking Companies will "Assign Truck Driver to Container";
- Trucking Companies will be able to keep information related to their drivers in the Extranet with the function "Manage Drivers".

The Extranet will also include additional functions to help stakeholders. Alerts will be sent to specific stakeholders if information that is changed in the Extranet affects them directly (the cancellation of a Voyage, for example). Various reports will also be available.

The Extranet is designed so that new functions may easily be added. The application described in this document is the first step in a fully integrated solution for Container management at the Port of Montreal.

Specifications Notes

- The following sections provide detailed specifications for each function. Validations and error codes are listed. This list is not exhaustive, however. At the implementation phase, supplementary validations and error codes will likely be required. For example, all transactions received for "Completed" containers should be declined.
- Cancellation of transactions (mainly Voyage Description and Bill of Lading) may have a significant impact because a great deal of information is deleted. A feature must be implemented to restrict these cancellations: super users could be created, special passwords could be added, or restrictions at the database level could be defined. The best solution will be identified at the implementation phase.

Information for Export Containers

Deciding which stakeholders will be able to provide information on Export Containers poses a particular problem. Two solutions exist:

1. Shipping Lines could provide the information. This is the solution presented in section 3.
2. Trucking Companies or Freight Forwarders could provide the information. This is presented as the alternate solution in section 3.21.

The recommended solution to implement is the one described in section 3.21. Reasons for this recommendation are detailed in the same section. The solution was chosen late in the design process, when it was discovered that Shipping Lines would not be able to provide export Container information as fast as expected.

3.2 Process Flow

3.2.1 Import Process Flow

Figure 2 is a visual representation of the import process that links stakeholders to ensure success from beginning to end.

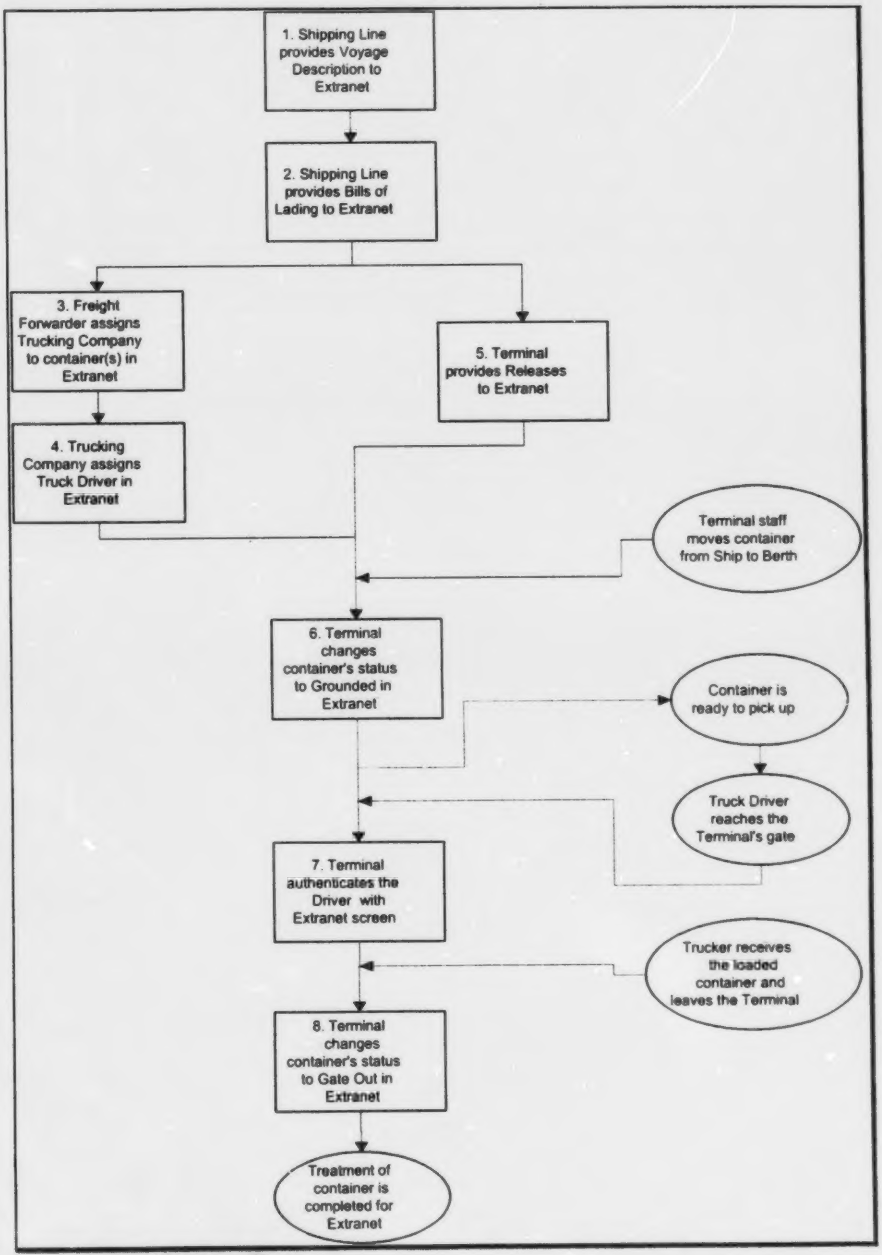

1. Shipping Line provides Voyage Description to Extranet
2. Shipping Line provides Bills of Lading to Extranet
3. Freight Forwarder assigns Trucking Company to container(s) in Extranet
5. Terminal provides Releases to Extranet
4. Trucking Company assigns Truck Driver in Extranet
Terminal staff moves container from Ship to Berth
6. Terminal changes container's status to Grounded in Extranet
Container is ready to pick up
Truck Driver reaches the Terminal's gate
7. Terminal authenticates the Driver with Extranet screen
Trucker receives the loaded container and leaves the Terminal
8. Terminal changes container's status to Gate Out in Extranet
Treatment of container is completed for Extranet

Figure 2 Import Process Flow

3.2.2 Export Process Flow

Figure 3 is a visual representation of the export process that links stakeholders to ensure success from beginning to end.

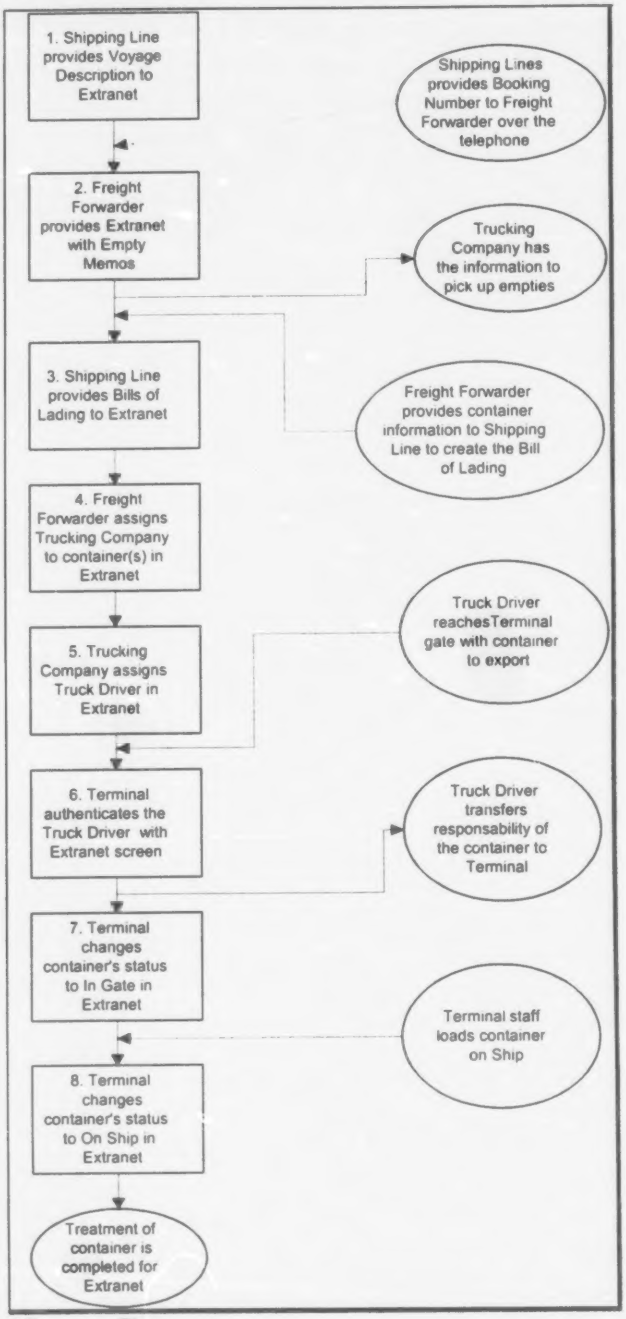

1. Shipping Line provides Voyage Description to Extranet
Shipping Lines provides Booking Number to Freight Forwarder over the telephone
2. Freight Forwarder provides Extranet with Empty Memos
Trucking Company has the information to pick up empties
3. Shipping Line provides Bills of Lading to Extranet
Freight Forwarder provides container information to Shipping Line to create the Bill of Lading
4. Freight Forwarder assigns Trucking Company to container(s) in Extranet
Truck Driver reachesTerminal gate with container to export
5. Trucking Company assigns Truck Driver in Extranet
6. Terminal authenticates the Truck Driver with Extranet screen
Truck Driver transfers responsability of the container to Terminal
7. Terminal changes container's status to In Gate in Extranet
Terminal staff loads container on Ship
8. Terminal changes container's status to On Ship in Extranet
Treatment of container is completed for Extranet

Figure 3 Export Process Flow

3.3 Provide Voyage Description

Description: The Voyage Description is the foundation of the Extranet system, since every Bill of Lading, Container, or Booking number is related to a specific Voyage. The Voyage Description defines information corresponding to a specific Voyage by identifying the vessel, estimated time of arrival and departure, related stakeholders, and type of Voyage (import or export). For one ship visiting the Port of Montreal, there will be two different Voyage numbers. A Voyage Description is necessary for both the import and export Voyages. These two Voyages are completely independent and do not need to be entered in the Extranet at the same time.

Who provides the information: The Shipping Line is responsible for sending the information to the Extranet for each Voyage transporting Containers.

When is the information supplied to the Extranet: The information must be sent as soon as it is available. The creation of the Voyage must be processed approximately two days before the ship's arrival (import) or departure (export). The Shipping Line must also send updates to the Extranet if the estimated time of departure or arrival changes. The Shipping Line must send the actual time of departure and arrival to the Extranet.

How is the information provided: The Shipping Line must provide the information through electronic transaction (EDI, HTTPS, or FTPS). See section 3.17 for more information. The Voyage Description transaction allows the Shipping Line to perform the following tasks:

1. Create a new Voyage;
2. Modify an existing Voyage;
3. Cancel a Voyage.

The Shipping Line will usually send one transaction to create the Voyage and one or more transactions to update the date/time of the Voyage.

If, for exceptional reasons, the Voyage is cancelled, the Shipping Line will send a transaction to cancel the Voyage, and all information corresponding to that Voyage will be deleted from the database.

Stakeholders (Terminal, Shipping Line, and Port) cannot be changed using a modify transaction. If, for any reason, a change of that kind is required, the Shipping Line will send a cancel Voyage transaction followed by a create Voyage transaction, to recreate the Voyage.

Stakeholder information is one of the basic pieces of information of all Voyage transactions. If this information changes, the data related to that Voyage becomes inaccurate. Therefore, it is better to delete all Voyage information and start again.

Prerequisites:

- Related Shipping Line and Terminal must exist in the Extranet. The Extranet administrator is responsible for the management of shipping lines and terminals within the Extranet (i.e., the creation or modification of stakeholder information).

3.3.1 Provide Voyage Description with Batch Transaction

FR-03-1	**Functional Requirement Name:** Provide Voyage Description with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Voyage Description transaction, validates it, updates Extranet database, and sends an acknowledgement to the Shipping Line.

INTRODUCTION:
See **Description** in section 3.3.

INPUT:
Transaction sent by the Shipping Line and reformatted by the translator (see Transaction: Voyage Description format).

PROCESSING:

1. **Create a new Voyage:**

Validation rules:

- The Voyage cannot exist in the Extranet;
- The related Shipping Line must exist in the Extranet;
- The related Terminal must exist in the Extranet;
- The related Port must exist in the Extranet;
- The Voyage date cannot be in the past.

Impact of the creation:

- The Voyage now appears on the Import Voyage List or Export Voyage List screen depending on whether it is an import or an export Voyage;
- For an export Voyage, the Freight Forwarder is now able to create and Manage Empty Memo;
- For an import or export Voyage, the Extranet is ready to receive any related Bill of Lading transactions from the Shipping Line.

Database modifications:

- Creates an entry in the Voyage table (key: vyge vessel id + vyge nbr) in relation to the proper Terminal (te actr id) and the proper Shipping Line (sl actr id).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 101: Transaction rejected, Voyage already exists;
- Reason code = 102: Transaction rejected, Shipping Line does not exist;
- Reason code = 103: Transaction rejected, Terminal does not exist;
- Reason code = 104: Transaction rejected, Port does not exist;
- Reason code = 109: Transaction rejected, Voyage date is in the past.

2. **Modify an existing Voyage:**

Validation rules:

- The Voyage must exist in the Extranet (vyge vessel id + vyge nbr);
- Modification of related Shipping Line is not allowed;
- Modification of related Terminal is not allowed;
- Modification of the related Port is not allowed;

FR-03-1	**Functional Requirement Name:** Provide Voyage Description with Batch Transaction	
Functional Focus:		**Priority:** High

Global impact of a modification:
- The information change is reflected on the Import Voyage List or Export Voyage List screen.

Impact of modifying date/time:
- Sends an alert to all related Freight Forwarders with a list of related Booking numbers and Bills of Lading;
- Sends an alert to all related Trucking Companies with a list of related Containers;
- Sends an alert to the related Terminal.

Database modifications:
- Updates related entries in Voyage and Vessel tables.

Possible responses to the transaction (Acknowledgement):
- Reason code = 000: OK, transaction processed successfully;
- Reason code = 105: Transaction rejected, Voyage does not exist;
- Reason code = 106: Transaction rejected, Terminal ID modification is forbidden;
- Reason code = 107: Transaction rejected, Shipping Line modification is forbidden;
- Reason code = 108: Transaction rejected, Port modification is forbidden.

3. Cancel a Voyage:

Validation rules:
- The Voyage must exist in the Extranet (vyge vessel id + vyge nbr).

Impact of the cancellation:
- The Voyage is deleted from the Import Voyage List or Export Voyage List screens;
- Sends an alert to the Terminal related to the Voyage;
- Sends an alert to all related Freight Forwarders (with at least one Booking number or Bill of Lading);
- Sends an alert to all related Trucking Companies (with at least one Container assigned).

Database modifications:
- Deletes related entries (key vyge vessel id + vyge nbr) in Voyage, Bill of Lading, Unit Summary, Actual Event, Order to Carrier, and Instruction to Truck Driver tables.

Possible responses to the transaction (Acknowledgement):
- Reason code = 000: OK, transaction processed successfully;
- Reason code = 105: Transaction rejected, Voyage does not exist.

4. Additional validations:

Here are additional validations not related to one specific transaction type.

Validation rules:
- The Transaction ID must be 'VD' for Voyage Description;
- The transaction type must be 'A' for Add, 'M' for Modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):
- Reason code = 901: Transaction rejected, invalid transaction ID;

FR-03-1	**Functional Requirement Name:** Provide Voyage Description with Batch Transaction
Functional Focus:	**Priority:** High

- Reason code = 902: Transaction rejected, invalid transaction type.

OUTPUT:

- Updates Extranet database for Voyage Description transaction, if it is valid;
- Sends an acknowledgement to the Shipping Line.

Function 1 Provide Voyage Description with Batch Transaction

Transaction: Voyage Description format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'VD'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Reference No	Number generated by Shipping Line, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of Shipping Line sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Port_name	Identification of Port	Mandatory	Alphanum.	60		Name synonym
Terminal_name	Identification of Terminal	Mandatory	Alphanum.	60		Name synonym
Vyge_impexp_cd	Indicator of Voyage type	Mandatory	Alphabetic	1	'E' for Export 'I' for Import	Voyage
Voyage Date	Date of Voyage (arrival for import and departure for export) Montreal	Mandatory	Date: yyyymmdd	8		Voyage

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
	time zone					
Voyage Time	Time of Voyage (arrival for import and departure for export), Montreal time zone	Optional	Time: hhmmss	6		Voyage
Vyge_ship_berth	Berth at terminal where ship is or will be	Mandatory	Alphabetic	30		Voyage
Vyge_total_nbr_of_units	Total number of Containers on the Voyage handled at the Port of Montreal	Optional	Numeric	5		Voyage

Table 2 Voyage Description Format

3.4 Provide Bill of Lading

Description: One Bill of Lading provides information on a specific Voyage for a group of Containers corresponding to one and only one Freight Forwarder, including details on each Container. One or several Bills of Lading may be issued per Voyage. Bills of Lading must be provided for import and export Voyages.

For import, the Freight Forwarder at the point of origin (Singapore, for example) issues the Bill of Lading, including all related Container information, and gives it to the Shipping Line. The Shipping Line must then provide that Bill of Lading to the Extranet. The name of the Freight Forwarder required on this Bill of Lading is not name of the Freight Forwarder that issued it (i.e., in Singapore), but the name of the Freight Forwarder handling the Containers at the Port of Montreal. This Freight Forwarder will assign Trucking Companies with the orders corresponding to those Containers in the Extranet.

For export, the origin of the Voyage is Montreal. The local Freight Forwarder is responsible for creating one or more Bills of Lading with Container information, and providing this information to the Shipping Line. The Shipping Line must then send the information to the Extranet. With this information, the local Freight Forwarder will be able to assign those Containers to Trucking Companies with related orders in the Extranet. In the Bill of Lading sent to the Extranet, the required Freight Forwarder name is the one handling the Containers at the Port of Montreal. For export, the Freight Forwarder that created the Bill of Lading will also assign Trucking Companies in the Extranet.

Before creating the Bill of Lading, the local Freight Forwarder will use the Manage Empty Memo function to provide the Trucking Companies with information on how to handle empty Containers. See section 3.6 for more information.

Who provides the information: The Shipping Line is responsible for providing the Extranet with all information related to the Bills of Lading of the Voyages it handles. This is true for import Voyages as well as export Voyages.

For export, even if the local Freight Forwarder creates the Bill of Lading information and provides it to the Shipping Line, the Shipping Line still has the last word on what Containers will be on the ship. This is why the Shipping Line, and not the Freight Forwarder, must send the information to the Extranet.

When is the information supplied to the Extranet: The information must be sent as soon as it is available. The creation of the Bills of Lading must be done approximately two days before the ship's arrival (import) or departure (export). The Shipping Line must send all updates on a Bill of Lading, or on one or several Containers, to the Extranet as soon as it has the information.

How is the information provided: The Shipping Line must provide the information through an electronic transaction (EDI, HTTPS or FTPS). See section 3.17 for more information. The Bill of Lading transaction allows the Shipping Line to perform the following tasks:

1. Create a new Bill of Lading;
2. Modify an existing Bill of Lading;
    - Modify the general information of the Bill of Lading;
    - Add Containers to the Bill of Lading;
    - Modify Container information in the Bill of Lading;
    - Delete Containers from the Bill of Lading.
3. Cancel a Bill of Lading.

To create the Bill of Lading, the Shipping Line will usually send one transaction including all Container information. A Bill of Lading must be related to a specific Voyage. The information "Vessel name / Voyage number" is used to match a Bill of Lading number with a specific Voyage.

The Shipping Line may also send one or more transactions to modify the Bill of Lading. This can be useful if, for some reason, Containers are added, removed, or modified on a Bill of Lading. The Modify Bill of Lading transaction sent by the Shipping Line only includes the Containers affected by the changes.

If, for exceptional reasons, the Bill of Lading is cancelled, the Shipping Line sends a transaction to cancel the Bill of Lading and all related information, and the Bill of Lading is deleted from the database.

If the entire Voyage is cancelled, the Shipping Line sends a Cancel Voyage Description transaction. It is not necessary to send a Cancel Bill of Lading transaction because the Cancel Voyage Description will automatically delete all Bills of Lading included in the Voyage.

One Bill of Lading transaction can contain one or more sub-transactions for Containers. For example, if one Bill of Lading contains ten Container sub-transactions and one of the Containers is not accepted by the Extranet (because of validation rules), the nine other sub-transactions will be applied to the Extranet and an acknowledgement with an error specific to the rejected sub-transaction will be sent to the Shipping Line.

Prerequisites:

- The related Freight Forwarder must exist in the Extranet. The Extranet administrator is responsible for the management of Freight Forwarders in the Extranet;
- The Shipping Line must have sent the Voyage Description transactions to the Extranet.

3.4.1 Provide Bill of Lading with Batch Transaction

FR-04-1	**Functional Requirement Name:** Provide Bill of Lading with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Bill of Lading transaction, validates it, updates Extranet database, and sends an acknowledgement to the Shipping Line.

INTRODUCTION:
See **Description** in section 3.4

INPUT:
Transaction sent by the Shipping Line and reformatted by the translator (see Transaction: Bill of Lading format).

PROCESSING:

1. Create a new Bill of Lading:

Validation rules:

- The related Freight Forwarder must exist in the Extranet;
- The related Voyage (Vessel name + Voyage number) must exist in the Extranet;
- A Bill of Lading must not exist for that specific Voyage (Vessel name + Voyage number + Bill of Lading number);
- The Shipping Line sending the transaction (stakeholder identifier) must be the same as the one related to the Voyage in the Extranet (as sent in the Voyage Description transaction).

FR-04-1	**Functional Requirement Name:** Provide Bill of Lading with Batch Transaction
Functional Focus:	**Priority:** High

Impact of the creation:

- The Bill of Lading and information about its Container(s) are now available to display on the various screens for related stakeholders (see section3.19);
- Related Terminal may provide status or releases in the Extranet for Containers included in the Bill of Lading;
- Related Freight Forwarder is now able to assign Trucking Companies to the Containers included in the Bill of Lading.

Database modifications:

- Creates entries for the Bill of Lading in the Bill of Lading and Unit Summary tables.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 201: Transaction rejected, Voyage does not exist;
- Reason code = 202: Transaction rejected, Bill of Lading number already exists for that Voyage;
- Reason code = 203: Transaction rejected, Freight Forwarder does not exist;
- Reason code = 204: Transaction rejected, Shipping Line sending the transaction is not the one related to the Voyage.

2.1 Modify general information of the Bill of Lading:

The only information in the Bill of Lading that is general and not related to a specific Container is the Freight Forwarder. The impact of such changes is significant. All the actions taken by the previous Freight Forwarder must be removed (Orders). The new Freight Forwarder will create its own orders, and will not use orders created by another Freight Forwarder because the latter usually works with specific Trucking Companies.

Validation rules:

- The Bill of Lading must exist for the related Voyage (Vessel name + Voyage number + Bill of Lading number);
- If the Freight Forwarder is changed, the new Freight Forwarder must exist in the Extranet;
- The Shipping Line sending the transaction (stakeholder identifier) must be the same as the one related to the Voyage in the Extranet (as sent in the
- Reason code = 203: Transaction rejected, Freight Forwarder does Voyage Description transaction).

Impact of modifying the Freight Forwarder:

- The information changes are reflected on various screens for related stakeholders;
- Sends an alert to the previous Freight Forwarder;
- If Orders (Trucking Companies assigned) exist for the related Bill of Lading, they are removed;
- If Instructions (Truck Driver assigned) exist for the related Bill of Lading, they are removed;
- If Orders are removed, alerts to related Trucking Companies are sent.

Database modifications:

- Updates related entry in the Bill of Lading (vyge vessel id + vyge nbr + bldng nbr) table with the name of the new Freight Forwarder (ff actr id);
- If relevant, deletes any related entries in the Order to Carrier and Standard Suborder

FR-04-1	**Functional Requirement Name:** Provide Bill of Lading with Batch Transaction	
Functional Focus:		**Priority:** High

tables (for vyge vessel id + vyge nbr + bldng nbr);

- If relevant to the deleted Orders, deletes related entries in Instruction to Truck Driver and Standard Subinstruction tables (for ordr id + stdsubord line nbr deleted).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;not exist;
- Reason code = 204: Transaction rejected, Shipping Line sending the transaction is not the one related to the Voyage;
- Reason code = 205: Transaction rejected, Bill of Lading does not exist.

2.2 Add Containers to the Bill of Lading

Supplementary validation rules:

- The Container added must not exist on that particular Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Impact of adding a Container to a Bill of Lading:

- The Container is displayed on the various screens for related stakeholders;
- Related Terminal may provide status or releases for the new Container;
- Related Freight Forwarder is now able to assign Trucking Companies to the new Container;
- Sends an alert to the related Freight Forwarder.

Database modifications:

- Creates entry in Unit Summary tables in relation with the proper Bill of Lading (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id).

Other possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 206: Transaction applied except Add Container # xxxyyyy, which already exists. A modified Bill of Lading transaction with a modified Container sub-transaction can be sent later.

2.3 Modify Container information on the Bill of Lading

Supplementary validation rules:

- The Container modified must exist in the Extranet for the same Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Database modifications:

- Updates related entry in Unit Summary table (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id).

Impact of modifying information on a specific Container:

- Sends an alert to the related Freight Forwarder;
- If the Container is assigned to a Trucking Company, an alert is sent to that Trucking Company.

FR-04-1	**Functional Requirement Name:** Provide Bill of Lading with Batch Transaction
Functional Focus:	**Priority:** High

Supplementary possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 207: Transaction applied except Modify Container # xxxyyyy, which does not exist.

2.4 Delete Containers from the Bill of Lading

Supplementary validation rules:

- The Container cancelled must exist in the Extranet for the same Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Impact of deleting a Container from the Bill of Lading:

- The Container disappears from related screen;
- If an Order exists, it is deleted;
- If an Instruction exits, it is removed;
- The Container is deleted with all related events;
- Sends an alert to the related Freight Forwarder;
- If the Container is assigned to a Trucking Company, an alert is sent to that Trucking Company.

Database modifications:

- Deletes related entries (key vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) in Unit Summary, Actual Event, Order to Carrier, Standard Suborder, Instruction to Truck Driver, and Standard Subinstructions.

Possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 208: Transaction applied except Cancel Container # xxxyyyy, which does not exist.

3. Cancel a Bill of Lading:

Validation rules:

- The Bill of Lading must exist in the Extranet (Vessel name + Voyage number + Bill of Lading number);
- The Shipping Line sending the transaction (stakeholder identifier) must be the same as the one related to the Voyage in the Extranet (as sent in the Voyage Description transaction).

Impact of the cancellation:

- The Bill of Lading and the information about its Container disappear from the various screens for related stakeholders;
- Sends an alert to the Freight Forwarder related to the Bill of Lading;
- Sends an alert to all Trucking Companies assigned to at least one of the Containers on the cancelled Bill of Lading.

FR-04-1	**Functional Requirement Name:** Provide Bill of Lading with Batch Transaction	
Functional Focus:		**Priority:** High

Database modifications:

- Deletes the entry in the Bill of Lading table (vyge vessel id + vyge nbr + bldng nbr);
- For each Container in the Bill of Lading, deletes related entries (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) in Unit Summary, Actual Event, Order to Carrier, Standard Suborder, Instruction to Truck Driver, and Standard Subinstructions.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 204: Transaction rejected, Shipping Line sending the transaction is not the one related to the Voyage;
- Reason code = 205: Transaction rejected, Bill of Lading does not exist.

4. Additional validations:

Here are additional validations not related to one specific transaction type.

Validation rules:

- The Transaction ID must be 'BL' for Bill of Lading;
- The transaction type must be 'A' for Add, 'M' for Modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

OUTPUT:

- Updates Extranet database for Bill of Lading transaction, if it is valid;
- Sends an acknowledgement to the Shipping Line.

Function 2 Provide Bill of Lading with Batch Transaction

Transaction: Bill of Lading format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction.	Mandatory	Alphabetic	2	'BL'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Reference No	Number generated by Shipping Line, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Stakeholder Identifier	Name of Shipping Line sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Bldng_nbr	Bill of Lading number	Mandatory	Alphanum.	20		Bill of Lading
Freight Forwarder Name (1)	Freight Forwarder identification	Mandatory	Alphanum.	60		
Number of Containers	Number of Containers included in transaction	Mandatory	Numeric	3		N/A
For each Container (loop)						
Sub Transaction Type	Type of action to be done with Container	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary
Unit_length	Length of Container	Mandatory	Numeric 8,4	12		Unit summary
Unit_length_units	Unit of measure for Container's length	Mandatory	Numeric	1	1: metres 2: feet	Unit summary
Unit_type	Type of Container	Mandatory	Numeric	2	01: regular 02: open top 03: high cube 04: flat 05: refer	Unit summary
Unit_loadempty_cd	Load or Empty indicator	Mandatory	Alphabetic	1	E: empty L: loaded U: unknown	Unit summary
Unit_weight	Gross weight	Mandatory	Numeric 8,4	12		Unit summary
Unit_weight_units	Unit of measure for Container's weight	Mandatory	Numeric	1	1: kg 2: metric tons 3: lb. 4: tons	Unit summary

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Unit_content	Container's content	Mandatory	Alphanum.	40	To be confirmed	Unit summary
Unit_danger_class_cd	Dangerous class code	Optional	Numeric	2	00: if none 32: means 3.2.	Unit summary
Unit_danger_un_cd	Dangerous UN code	Optional	Numeric	6		Unit summary
Unit_place_of_delivery	Container's place of delivery (final destination)	Optional	Alphanum.	40		Unit summary
Unit_custom_check_locn	Place for custom location if any	Mandatory for import	Alphanum.	30		Unit summary
Init carrier company	Initial transport company	Optional	Alphanum.	30		Unit summary
Unit storage dttm	Storage date, for import only	Optional	Date	8		Unit summary
Unit cutoff dttm	Cutoff time, for export only	Optional	Date	8		Unit summary

Table 3 Bill of Lading Format

(1): The Freight Forwarder is the only field considered General Information; all other fields are specific to a Container.

3.5 Assign Trucking Company to Container

Description: Each Container in the Extranet must be assigned to a Trucking Company. The assignment must be done for both Import and Export Containers, and must specify the Trucking Company, the transport instructions, and the date of transport. This assignment will issue an Order to Carrier that will be used by the Trucking Company.

In the case of an import Container, it is very important that the Freight Forwarder specify what to do with the empties after delivery. This is done through a free-form memo.

On the Bill of Lading sent by the Shipping Line, information on each Container may specify the carrier. This initial carrier for the Container may be a trucking or railway company such as CN or CP.

The purpose of Assigning a Trucking Company to a Container is to allow the Freight Forwarder, using an Order for the Container, to assign the Trucking Company that will be responsible for handling the Container. An Order includes a date of completion and a free-form instruction. Free-form instructions contain information (precautions, open top Container) that the Freight Forwarder might give to the Trucking Company to handle the Container better.

If the final carrier is a railway company, no Order is necessary because railway companies are not yet included as stakeholders in the Extranet. If the initial carrier was a railway company, and the final carrier remains a railway company, the Freight Forwarder may leave the value as it is with no further action. The Carrier can be displayed for related stakeholders.

An Order may include one or more suborders (one suborder for each Container). The Order given to the Trucking Company includes general instructions for a group of Containers, as well as specific instructions for each Container.

Initially, each Order defined by a Freight Forwarder will only be allowed to include one suborder because processing in the Extranet is done on a single Container basis. Although the database model is designed to manage Orders and suborders, the application is not.

An Order can also be printed once it is created in the Extranet. The Freight Forwarder who created the Order may want to print it to keep track of the work that has been assigned. The Trucking Company for which the Order is issued may also print it. The Transport Assignment screen allows these stakeholders to print Orders.

Who provides the information: The Freight Forwarder is responsible for providing Trucking Company assignments for every Container on import or export Voyages.

When is the information supplied to the Extranet: The information must be supplied as soon as the Freight Forwarder determines which Trucking Company will handle the Container. The Container must also be defined in the Extranet for the corresponding Voyage and Bill of Lading.

How is the information provided: The Freight Forwarder may choose the best way to supply the information, either on-line using the Extranet screen or by sending a batch transaction.

3.5.1 Assign Trucking Company to Container with Extranet Screen

FR-05-1	**Functional Requirement Name:** Assign Trucking Company to Container with Extranet Screen
Functional Focus:	**Priority:** High

Functional Requirement Definition: The Freight Forwarder accesses the Extranet screen and assigns a Trucking Company to a Container.

INTRODUCTION:

The Transport Assignment screen allows the Freight Forwarder to perform the following actions (the screen is accessible through the Container Detail screen):

1. Assign a Trucking Company to a Container (no Trucking Company previously assigned);
2. Assign a Trucking Company to a Container (another Trucking Company previously assigned);
3. Assign a Trucking Company to a Container (Container previously assigned to a wagon);
4. Cancel current Trucking Company assignment by selecting *none* as Trucking Company. This is useful if the Freight Forwarder has assigned a Trucking Company to the wrong Container by mistake.

For more information, see **Description** in section 3.5.

INPUT:

Information keyed in and submitted by the Freight Forwarder on the Extranet screen.

Prerequisites:

- The Shipping Line must have sent the related transactions (Voyage Description and Bill of Lading) to the Extranet;
- The name of the related Freight Forwarder must be included in the Bill of Lading transaction sent by the Shipping Line. The Freight Forwarder logged on must be the one appearing in the transaction, otherwise it will not be able to retrieve the Container in the Extranet;
- The related Trucking Company must exist in the Extranet because it must be selected from a pre-existing list. Management of Trucking Companies in the Extranet is done by the Extranet administrator.

PROCESSING:

1. Assign a new Trucking Company (with actions 1, 2 or 3):

Impact of the assignment:

- The Container now appears on the various screens available to the newly assigned Trucking Company;
- The Trucking Company is now able to assign a Truck Driver to the Container.

Database modifications:

- Creates a new Order to Carrier (ordr id generated) for the related Freight Forwarder (ff actr id) and Trucking Company (carrier actr id);
- Creates a new Standard Suborder related to the Container (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) and to the Order to Carrier just created (ordr id).

2. Cancel the assignment of a Trucking Company (with actions 2 or 4):

Impact of the cancellation:

- The Container disappears from the various screens of the previous Trucking Company;

FR-05-1	**Functional Requirement Name:** Assign Trucking Company to Container with Extranet Screen
Functional Focus:	**Priority:** High

- If there was a Truck Driver assigned to the Container, that assignment is cancelled;
- Sends an alert to the previous Trucking Company by e-mail to inform it that the Container is no longer assigned to it;

Database modifications:

- Deletes the Order (Order to Carrier, Standard Suborder tables) for the previous Trucking Company related to the specific Container (Unit Summary table):
    - Deletes Standard Suborder: vyge vessel id + vyge nbr + bldng nbr + unit inin id + unit nbr id.
    - Deletes Order to Carrier for the Standard Suborder just deleted: carrier actr id + ordr id.
- If a Truck Driver was assigned to the Order, deletes the assignment (Instruction to Truck Driver, Standard Subinstruction tables):
    - If a Subinstruction exists for the Standard Suborder deleted, it must be deleted: tk actr id + ff actr id + ordr id;
    - Deletes Instruction to Truck Driver for the Subinstruction just deleted: tk actr id + instr id.

OUTPUT:

- Updates Extranet database for the Trucking Assignment created, modified, or cancelled by the Freight Forwarder;
- Displays a confirmation message on the Extranet screen for the Freight Forwarder.

Function 3 Assign Trucking Company to Container with Extranet Screen

3.5.2 Assign Trucking Company to Container with Batch Transaction

FR-05-2	**Functional Requirement Name:** Assign Trucking Company to Container with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Transport Company Assignment transaction, validates it, updates Extranet database, and sends an acknowledgement to the Freight Forwarder.

INTRODUCTION:

The Transport Company Assignment transaction allows the Freight Forwarder to perform the following actions:

1. Add a new Trucking Company assignment for a Container;
2. Modify an existing Trucking Company assignment;
3. Cancel the current Trucking Company assignment.

For more information, see **Description** in section 3.5.

INPUT:

Transaction sent by the Freight Forwarder and reformatted by the translator (see Transaction: Transport Company Assignment format).

Prerequisites:

- The Shipping Line must have sent the related transactions (Voyage Description and Bill of Lading) to the Extranet;

FR-05-2	**Functional Requirement Name:** Assign Trucking Company to Container with Batch Transaction

Functional Focus: **Priority:** High

- The name of the related Freight Forwarder must be included in the Bill of Lading transaction sent by the Shipping Line. The Freight Forwarder sending the transaction must be the one appearing in the transaction, otherwise it will not be able to retrieve the Container in the Extranet;
- The related Trucking Company must exist in the Extranet because it must be selected from a pre-existing list. Management of Trucking Companies in the Extranet is done by the Extranet administrator.

PROCESSING:

1. Add a new Trucking Company assignment:

Validation rules:

- The Container for the related Voyage must exist in the Extranet (Vessel name + Voyage number + Container number);
- The Trucking Company must exist in the Extranet;
- No assignment (Order) must exist for the related Container (Vessel name + Voyage number + Container number);
- The Freight Forwarder (stakeholder identifier) sending the transaction must be the one related to the Bill of Lading in the Extranet (as sent in the Bill of Lading transaction).

Impact of the assignment:

- The Container now appears on the various screens available to the newly assigned Trucking Company;
- The Trucking Company is now able to assign a Truck Driver to the Container.

Database modifications:

- Creates a new Order to Carrier (ordr id generated) for the related Freight Forwarder (ff actr id) and Trucking Company (carrier actr id);
- Creates a new Standard Suborder related to the Container (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) and to the Order to Carrier just created (ordr id).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 301: Transaction rejected, Container for the specific Voyage does not exist in the Extranet;
- Reason code = 302: Transaction rejected, Trucking Company does not exist in the Extranet;
- Reason code = 303: Transaction rejected, Assignment for that Container already exists;
- Reason code = 304: Transaction rejected, Freight Forwarder sending the transaction is not the one related to the Bill of Lading.

2. Modify an existing Trucking Company assignment:

Validation rules:

- The Container for the related Voyage must exist in the Extranet (Vessel name + Voyage number + Container number);
- If the Trucking Company is changed, the new one must exist in the Extranet;
- The assignment (and related Order) must exist in the Extranet (Vessel name + Voyage number + Container number);
- The Freight Forwarder (stakeholder identifier) sending the transaction must be the one

FR-05-2	**Functional Requirement Name:** Assign Trucking Company to Container with Batch Transaction
Functional Focus:	**Priority:** High

related to the Bill of Lading in the Extranet (as sent in the Bill of Lading transaction).

Impact of modifying the assignment (order date or memo):

- Modifications are reflected in the Trucking Company Assignment screen.

Database modifications:

- Updates the Order (Order to Carrier and Standard Suborder tables) for the Trucking Company related to the specific Container.

Impact of changing the Trucking Company:

- Sends an alert to the previous Trucking Company notifying it that it is no longer handling the Container;
- The Container is no longer displayed on the lists of the previous Trucking Company;
- If a Truck Driver was assigned to the Order, that assignment is cancelled (Instruction to Truck Driver);
- The Container now appears on the various screens of the newly assigned Trucking Company;
- The new Trucking Company is now able to assign a Truck Driver to the Container.

Specific database modifications:

- Deletes the existing Order related to the specific Container (Order to Carrier, Standard Suborder tables) for the previous Trucking Company (Unit Summary table);
  - Deletes Standard Suborder: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id.
  - Deletes Order to Carrier for the Standard Suborder just deleted: carrier actr id + ordr id.
- If a Truck Driver was assigned the Order, deletes the assignment (Instruction to Truck Driver, Standard Subinstruction tables):
  - If a Subinstruction exists for the Standard Suborder deleted, it must be deleted: tk actr id + ff actr id + ordr id;
  - Deletes Instruction to Truck Driver for the Subinstruction just deleted: tk actr id + instr id.
- Creates a new order (Order to Carrier, Standard Suborder tables) for the Trucking Company related to the specific Container (Unit Summary table):
  - Creates a new Order to Carrier (ordr id generated) for related Freight Forwarder (ff actr id) and Trucking Company (carrier actr id);
  - Creates a new Standard Suborder related to the Container (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) and the Order to Carrier just created (ordr id).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 301: Transaction rejected, Container for the specific Voyage does not exist in the Extranet;
- Reason code = 302: Transaction rejected, Trucking Company does not exist in the Extranet;
- Reason code = 304: Transaction rejected, Freight Forwarder sending the transaction is not the one related to the Bill of Lading;
- Reason code = 305: Transaction rejected, Assignment for that Container does not exist.

FR-05-2	**Functional Requirement Name:** Assign Trucking Company to Container with Batch Transaction
Functional Focus:	**Priority:** High

3. Cancel a Trucking Company assignment:

Validation rules:

- The Container for the related Voyage must exist in the Extranet (Vessel name + Voyage number + Container number);
- The assignment (and related Order) must exist in the Extranet (Vessel name + Voyage number + Container number);
- The Freight Forwarder (stakeholder identifier) sending the transaction must be the one related to the Bill of Lading in the Extranet (as sent in the Bill of Lading transaction).

Impact of the cancellation:

- The Container no longer appears on the screens of the previous Trucking Company;
- No Trucking Company appears for that Container on the screens of other stakeholders;
- If a Truck Driver was assigned to the Container, that assignment is cancelled;
- Sends an alert to the previous Trucking Company by e-mail to inform it that the Container has been reassigned to another Trucking Company.

Database modifications:

- Deletes the Order related to the specific Container (Order to Carrier, Standard Suborder tables) for the previous Trucking Company (Unit Summary table):
  - Deletes Standard Suborder: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id;
  - Deletes Order to Carrier for the Standard Suborder just deleted: carrier actr id + ordr id.
- If a Truck Driver was assigned to the Order, deletes the assignment (Instruction to Truck Driver, Standard Subinstruction tables):
  - If a Subinstruction exists for the Standard Suborder deleted, it must be deleted: tk actr id + ff actr id + order id;
  - Deletes Instruction to Truck Driver for the Subinstruction just deleted: tk actr id + instr id.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 301: Transaction rejected, Container for the specific Voyage does not exist in the Extranet;
- Reason code = 304: Transaction rejected, Freight Forwarder sending the transaction is not the one related to the Bill of Lading;
- Reason code = 305: Transaction rejected, Assignment for that Container does not exist.

4. Additional validations:

Here are additional validations not related to a specific transaction type.

Validation rules:

- The Transaction ID must be 'TA' for Trucking Company Assignment;
- The transaction type must be 'A' for Add, 'M' for Modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

FR-05-2	**Functional Requirement Name:** Assign Trucking Company to Container with Batch Transaction	
Functional Focus:		**Priority:** High

OUTPUT:

- Updates Extranet database for the Trucking Company Assignment transaction, if it is valid;
- Sends an acknowledgement to the Freight Forwarder.

Function 4 Assign Trucking Company to Container with Batch Transaction

Transaction: Trucking Company Assignment format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'TA'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Reference No	Number generated by Freight Forwarder, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of Freight Forwarder sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Bldng_nbr	Bill of Lading number	Mandatory	Alphanum.	20		Bill of Lading
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary
Trucking cie_name	Name of Trucking Company assigned to the Container.	Mandatory	Alphanum.	60		

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Order_expected_achiev_dt	Date expected to complete transport of Container	Mandatory	Date:	8	yyyymmdd	Order to Carrier
Stdordr_note	Transport instructions given by Freight Forwarder to Trucking Company, including what to do with empties	Mandatory	Alphanum.	From 1 to 1024		Standard order

Table 4 Trucking Company Assignment Transaction Format

3.6 Manage Empty Memo

Description: For exports, the next step following the creation of a Voyage Description in the Extranet is to create Empty Memos specific to a Trucking Company. These memos will contain information on where to pick up empties for an incoming export Order. If empty Containers are to be picked up at a Terminal, it is important to link the Empty Memo to a valid booking number. The Freight Forwarder creates an Empty Memo using a booking number provided by the Shipping Line (over the telephone with a fax confirmation). In the memo, the Freight Forwarder specifies the Trucking Company, date of completion, number of Containers, and a free-form memo containing information such as the type of Container to be picked up or where to pick up empties. The Freight Forwarder may use the same booking number for different Trucking Companies.

A booking is a **contract** between the Shipping Line and the Freight Forwarder to reserve room for Containers on a Voyage. The Shipping Line provides the Freight Forwarder with a booking number that is valid for a certain number of Containers (for example, 25 Containers for booking no. 243). The Freight Forwarder may decide to use this booking number for one or several Trucking Companies. Some information is required for the Extranet (for example, which bookings are assigned to which Trucking Companies) and some is not (for example, whether a Booking is partial or complete).

In sample booking no.243, information to be defined in the Extranet are Empty Memos such as the following:

1. Booking #243 for Trucking Company A for 10 Containers with related instructions.
2. Booking #243 for Trucking Company B for 15 Containers with related instructions.

Validations cannot be made for booking numbers because the Shipping Lines manage those numbers outside the Extranet.

Once an Empty Memo is created in the Extranet, it can be printed. The Freight Forwarder who created it may want to print a copy to keep track of the work that was assigned. The Trucking Company to which the Empty Memo is assigned may also want to print it to know what needs to be done. The Empty Memo Instructions screen allows these stakeholders to print the memo.

The Empty Memo is useful when handling empty Containers with unknown numbers. The Freight Forwarder creates an Empty Memo (using a free-form memo) for a specific Trucking Company to provide information on how many Containers are to be handled, what type they are, and how empties should be handled for an incoming export Order.

When Container numbers are known, the Extranet receives the Bill of Lading transaction from the Shipping Line, at which time Empty Memos become obsolete. The process continues with the Assign Trucking Company to Container, Assign Truck Driver to Container, and Change Container Status transactions, exactly like in the import process.

Who provides the information: The Freight Forwarder is responsible for providing the Extranet with all Empty Memo information for a specific Voyage.

When is the information supplied to Extranet: The information must be supplied as soon as the Voyage exists in the Extranet and the Freight Forwarder knows which Trucking Company will be assigned to the Empty Memo.

How is the information provided: The Freight Forwarder may choose the best way to supply the information, either on-line using the Extranet screen or by sending a batch transaction.

3.6.1 Manage Empty Memo with Extranet Screen

FR-06-1	**Functional Requirement Name:** Manage Empty Memo with Extranet Screen
Functional Focus:	**Priority:** High

Functional Requirement Definition: The Freight Forwarder accesses the Extranet screen and creates an Empty Memo for a specific Trucking Company.

INTRODUCTION:
The Manage Empty Memo screen allows the Freight Forwarder to perform the following actions (the screen is accessible through a side menu):

1. Add an Empty Memo for a specific Trucking Company with the related information;
2. Modify information in an existing Empty Memo for a specific Trucking Company;
3. Delete an existing Empty Memo for a specific Trucking Company.

For more information, see **Description** in section 3.6.

INPUT:
Information keyed in and submitted by the Freight Forwarder to the Extranet screen.

Prerequisites:

- The Shipping Line must have sent the related Voyage Description transaction to the Extranet;
- The related Trucking Company must exist in the Extranet because it must be selected from a pre-existing list. Management of Trucking Companies in the Extranet is done by the Extranet administrator;
- To add an Empty Memo, the Freight Forwarder must have a valid booking number given by the Shipping Line. Booking number validation is not possible through the Extranet.

PROCESSING:

1. Add an Empty Memo:

Impact of the creation:

- The Empty Memo is now on the Empty Memo List screen for related users, and the Trucking Company has the information to handle the Containers.

Database modifications:

- Creates a new Empty Memo (Order to Carrier tables with an order type as "free order") in relation to the proper Voyage and Trucking Company:
  - Key: ff actr id + carrier actr id + freeordr vyge vessel id + freeordr vyge nbr and with ordr type set properly.

2. Modify an Empty Memo:

Impact of modifying an Empty Memo:

- The information displayed on the Empty Memo List and Empty Memo Instructions screens will reflect the changes.

Impact of changing the corresponding Trucking Company:

- The Empty Memo disappears from the screens of the previous Trucking Company;
- An alert is sent to the previous Trucking Company to inform it that it is no longer assigned to the Empty Memo;
- The new Trucking Company now sees the Empty Memo on the Empty Memo List screen.

FR-06-1	**Functional Requirement Name:** Manage Empty Memo with Extranet Screen
Functional Focus:	**Priority:** High

Database modifications:

- Updates the Empty Memo (Order to Carrier table with an order type as "free order") in relation to the proper Voyage and Trucking Company:
    - Key: ff actr id + carrier actr id + freeordr vyge vessel id + freeordr vyge nbr and with ordr typw set properly.

3. Delete an Empty Memo:

Impact of deleting an Empty Memo:

- The Empty Memo is no longer included on the Empty Memo List screen for related users;
- An alert is sent to the Trucking Company to inform it that it is no longer assigned to the Empty Memo.

Database modifications:

- Deletes the Empty memo (Order to Carrier table with an order type as "free order") in relation to the proper Voyage and Trucking Company:
    - Key: ff actr id + carrier actr id + freeordr vyge vessel id + freeorde vyge nbr and with ordr typw set properly.

OUTPUT:

- Updates Extranet database for the Empty Memo created, modified, or deleted by the Freight Forwarder;
- Displays a confirmation message on the Extranet screen for the Freight Forwarder.

Function 5 Manage Empty Memo with Extranet Screen

3.6.2 Manage Empty Memo with Batch Transaction

FR-06-2	**Functional Requirement Name:** Manage Empty Memo with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Manage Empty Memo transaction, validates it, updates Extranet database, and sends an acknowledgement to the Freight Forwarder.

INTRODUCTION:

The Manage Empty Memo transaction allows the Freight Forwarder to perform the following actions:

1. Add an Empty Memo for a specific Trucking Company with the related information;
2. Modify information on an existing Empty Memo for a specific Trucking Company;
3. Delete an existing Empty Memo for a specific Trucking Company.

For more information, see **Description** in section 3.6.

INPUT:

Transaction sent by the Freight Forwarder and reformatted by the translator (see Transaction: Manage Empty Memo format).

Prerequisites:

- The Shipping Line must have sent the related Voyage Description transaction to the Extranet;
- The Trucking Company must exist in the Extranet. Management of Trucking Companies

FR-06-2	**Functional Requirement Name:** Manage Empty Memo with Batch Transaction
Functional Focus:	**Priority:** High

in the Extranet is done by the Extranet administrator;
- To add an Empty Memo, the Freight Forwarder must have a valid booking number given by the Shipping Line. This is done outside the Extranet.

PROCESSING:

1. Add an Empty Memo:

Validation rules:

- The Voyage must exist in the Extranet (Vessel name + Voyage number);
- The Trucking Company must exist in the Extranet;
- An empty Memo must not exist for the Trucking Company in the Extranet (Vessel name + Voyage number + booking number + Sequential number + Trucking Company name for booking).

Impact of the creation:

- The Empty Memo is now on the Empty Memo List screen for related users, and the Trucking Company has the information to handle the Containers.

Database modifications:

- Creates a new Empty Memo (Order to Carrier table with an order type as "free order") in relation to the proper Voyage and Trucking Company:
  - Key: ff actr id + carrier actu id + freeordr vyge vessel id + freeordr vyge nbr and with ordr type set properly.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 401: Transaction rejected, Voyage does not exist in the Extranet;
- Reason code = 402: Transaction rejected, Trucking Company does not exist in the Extranet;
- Reason code = 403: Transaction rejected, Empty Memo for that Trucking Company already exists with same booking number and sequential number.

2. Modify an Empty Memo:

Validation rules:

- The Voyage must exist in the Extranet (Vessel name + Voyage number);
- If the Trucking Company is changed, the new one must exist in the Extranet;
- An empty Memo must exist for the Trucking Company in the Extranet (Vessel name + Voyage number + booking number + sequential number + Trucking Company name for the Empty Memo).

Impact of modifying an Empty Memo:

- The information displayed on the Empty Memo List and Empty Memo Instructions screens will reflect the changes.

Impact of changing the related Trucking Company:

- The Empty Memo disappears from the screens of the previous Trucking Company;
- An alert is sent to the previous Trucking Company to inform it that it is no longer assigned to the Empty Memo;
- The new Trucking Company now sees the Empty Memo on the related Empty Memo List screen.

FR-06-2	**Functional Requirement Name:** Manage Empty Memo with Batch Transaction
Functional Focus:	**Priority:** High

Database modifications:

- Updates the Empty Memo (Order to Carrier table with an order type as "free order") in relation to the proper Voyage and Trucking Company.
    - Key: ff actr id + carrier actr id + freeordr vyge vessel id + freeordr vyge nbr and with ordr type set properly.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 401: Transaction rejected, Voyage does not exist in the Extranet;
- Reason code = 402: Transaction rejected, Trucking Company does not exist in the Extranet;
- Reason code = 404: Transaction rejected, Empty Memo with specific booking number and sequential number for that Trucking Company does not exist.

3. Delete an Empty Memo:

Validation rules:

- The Voyage must exist in the Extranet (Vessel name + Voyage id);
- An empty Memo must exist for the Trucking Company in the Extranet (Vessel name + Voyage number + booking number + sequential number + Trucking Company name for Empty Memo).

Impact of deleting an Empty Memo:

- The Empty Memo disappears from the Empty Memo List screen for related users;
- An alert is sent to the Trucking Company to inform it that it is no longer assigned to the Empty Memo.

Database modifications:

- Deletes the Empty Memo (Order to Carrier table with an order type as "free order") in relation to the proper Voyage and Trucking Company.
    - Key: ff acty id + carrier actr id + freeordr vyge vessel id + freeordr vyge nbr and with ordr type set properly.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 401: Transaction rejected, Voyage does not exist in the Extranet;
- Reason code = 404: Transaction rejected, Empty Memo with specific booking number and sequential number for that Trucking Company does not exist.

4. Additional validations:

Here are additional validations not related to one specific transaction type.

Validation rules:

- The Transaction ID must be 'EM' for Empty Memo;
- The transaction type must be 'A' for Add, 'M' for Modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

FR-06-2	**Functional Requirement Name:** Manage Empty Memo with Batch Transaction
Functional Focus:	**Priority:** High

OUTPUT:

- Updates Extranet database for Manage Empty Memo transaction, if it is valid;
- Sends an acknowledgement to the Freight Forwarder.

Function 6 Manage Empty Memo with Batch Transaction

Transaction: Manage Empty Memo format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'EM'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Reference No	Number generated by Freight Forwarder, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of the Freight Forwarder sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Bkng_nbr	Booking number	Mandatory	Alphanum.	20		Booking
Bkng_seq_nbr	Sequential number to ensure a unique Empty Memo, since one booking number may be used several times for different Trucking Companies	Mandatory	Numeric	2		Booking

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Trucking cie_name	Name of Trucking Company assigned to Empty memo	Mandatory	Alphanum.	60		
Bkng_date	Date expected to complete the empty memo. Montreal time zone	Mandatory	Date	8	yyyymmdd	Booking
Bkng_nbr_units	Number of Containers related to the Empty Memo	Mandatory	Numeric	2		Booking
Freeordr_note	Empty Memo Instructions given by Freight Forwarder to Trucking Company	Mandatory	Alphanum.	From 1 to 1024		Free-form order

Table 5 Manage Empty Memo Format

f2

3.7 Change Container Status

Description: The main objective of the Extranet is to provide Container status for all related stakeholders. It is important that each expected status be reported in the Extranet. The changes in status must be provided for both import and export Containers.

Accurate Container status information will prevent situations such as the following:

- Truck Drivers arriving at the Terminal for Containers that are not ready to be picked up;
- Trucking Companies calling to find out whether Containers are ready (for import);
- Freight Forwarders calling to find out whether Containers are ready (for import) or whether they have departed (for export);

The Extranet will publish two kinds of information on Containers:

1. Status, to provide information on where the Container is.
    a. For import containers, status evolves from Initial, to Grounded, to Gate Out.
    b. For export Containers, status evolves from Initial, to In Gate, to On Ship.
2. Releases (for import Containers), to let stakeholders know whether there is a hold on a Container or whether it has been released.

For import Containers, if all releases are OK and if the status is grounded, a global status **green** is displayed on the various screens to let stakeholders know that the Container is ready to be handled. Otherwise, the global status is **red**. A change in status will generate an alert to the Trucking Company.

The status may also regress. For example, it may change from Grounded to Initial (the Grounded status may have been a mistake).

When a Container is created, it can have the following characteristics:

- Initial status (import or export);
- Container on Hold for Shipping Line (import);
- Container Released from Agriculture Canada (import);
- Container on Hold for Canada Customs (import);
- Container on Hold for Terminal (import).

The objective is to report any changes to these initial characteristics, and to reach a point where the treatment of a Container is completed. For an import Container, treatment is considered completed if the status is Gate Out. For export Containers, treatment is considered completed if the status is On Ship. Completion of Container treatment affects when the information will be archived (see section 3.11).

Who provides the information: The Terminal must provide the Extranet with all status changes for each Container under its responsibility. For import Containers, the Terminal must also provide all releases and holds to the Extranet.

Releases and holds are initiated by different stakeholders (Canada Customs, Agriculture Canada, Shipping Lines and the Terminal) but the Terminal always has the last word on the state of the releases. The Terminal receives the information from the stakeholders and then updates the information in the Extranet.

When is the information supplied to the Extranet: To have an efficient Extranet, it is necessary to receive all updates as quickly as possible. That way, accurate information can be provided to the different stakeholders and unnecessary phone calls can be avoided. A delay of 15 to 30 minutes between the action and the report in the Extranet is acceptable.

How is the information provided: The function may be accomplished on-line through the Extranet screen or by sending batch transactions. The Terminal may choose the most appropriated method.

3.7.1 Change Container Status with Extranet Screen

FR-07-1	**Functional Requirement Name:** Change Container Status with Extranet Screen	
Functional Focus:		**Priority:** High

Functional Requirement Definition: The Terminal accesses the Extranet screen and reports releases or status for a specific Container.

INTRODUCTION:
For Import, the Terminal may perform the following actions:

1. Report a Container's Release (Customs, Agriculture, Shipping Line, or Terminal);
2. Report a Container's Hold (Customs, Agriculture, Shipping Line, or Terminal);
3. Change a Container's status to one of the following:
    a. Initial;
    b. Grounded;
    c. Gate Out.

For Export, the Terminal may perform the following action:

4. Change a Container's status to one of the following:
    a. Initial;
    b. In Gate;
    c. On Ship.

The Container Detail screen allows the Terminal to perform these tasks.

For more information, see **Description** in section 3.7.

INPUT:
Information keyed in and submitted by the Terminal to the Extranet screen.

Prerequisites:

- The Shipping Line must have sent the related Voyage Description and Bill of Lading transactions to the Extranet;
- In the Voyage Description transaction sent by the Shipping Line, the name of the related Terminal must be included. The Terminal logged on must be the one appearing in the transaction, otherwise it will not be able to retrieve the Container in the Extranet.

PROCESSING:

1. Report a Release (change value to OK for one of the four possible releases):
It must be reported when one of the stakeholders releases a Container (Customs, Agriculture, Shipping Line, or Terminal).

Impact of reporting a release:

- If the release was the last thing detaining the Container (all other releases are OK and status is Grounded), the Container now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table for the related Container for that event (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

FR-07-1	**Functional Requirement Name:** Change Container Status with Extranet Screen	
Functional Focus:		**Priority:** High

2. Report a Hold (change value to Hold for one of the four releases):

It must be reported if one of the stakeholders (Customs, Agriculture, Shipping Line, or Terminal) decides to put a hold on the Container.

Impact of reporting a Hold:

- The Container now appears as red in all related lists.

Database modifications:

- Updates the corresponding entry in the Actual Event table to indicate the cancellation of the release (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

3. Report a status for import Container:

The Terminal will be able to choose one of the following three values: Initial, Grounded, or Gate Out.

3a. Changing the status to Initial

Initial is the default value of a Container, but if a Grounded or Gate Out status is reported by mistake, the status can be changed back to Initial.

Impact of changing the status to Initial:

- Cancels existing Grounded or Gate Out event;
- If previously complete, the treatment of the Container is not considered completed anymore;
- The global status now appears as red in all related lists.

Database modifications:

- Updates entries in the Actual Event table for the related Container by changing the Event Grounded or Gate Out and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

3b. Changing the status to Grounded

It must be reported when the Container is moved from the Ship to the Berth by Terminal staff. If a Gate Out status is reported by mistake, it can be changed back to Grounded.

Impact of changing the status to Grounded:

- Cancels existing Gate Out event;
- Creates an event Grounded;
- If all releases are OK, the global status now appears as red in all related lists.

Database modifications:

- If needed, updates entries in the Actual Event table for the related Container by changing the event Gate Out and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id);
- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

3c. Changing the status to Gate Out

It must be reported when the Truck Driver leaves the Terminal with the import Container.

FR-07-1	**Functional Requirement Name:** Change Container Status with Extranet Screen
Functional Focus:	**Priority:** High

Impact of changing the status to Gate Out:

- Creates an event Gate Out;
- The treatment of the Container is now considered completed;
- The global status now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

4. Report a status for export Container:

The Terminal will be able to choose one of the following three values: Initial, In Gate, or On Ship.

4a. Changing the status to Initial

Initial is the default value of a Container, but if an In Gate or On Ship status is reported by mistake, the status can be changed back to Initial.

Impact of changing the status to Initial:

- Cancels existing In Gate or On Ship event;
- If previously complete, the treatment of the Container is not considered completed anymore;
- The global status now appears as red in all related lists.

Database modifications:

- Update entries in the Actual Event table for the related Container by changing the event In Gate or On Ship and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

4b. Changing the status to In Gate

It must be reported when the Truck Driver reaches the Terminal Gate with the export Container. If an On Ship status was reported by mistake, it can be changed back to In Gate.

Impact of changing the status to In Gate:

- Cancels existing On Ship event;
- Creates an event In Gate;
- The global status now appears as green in all related lists.

Database modifications:

- If needed, updates entries in the Actual Event table for the related Container by changing the event On Ship and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id);
- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

If needed, updates entries in the Actual Event table for the related Container by changing the Event Gate Out and reporting the cancellation.

4c. Changing the status to On Ship

It must be reported when the Container is loaded onto the Ship by Terminal staff.

FR-07-1	**Functional Requirement Name:** Change Container Status with Extranet Screen	
Functional Focus:		**Priority:** High

Impact of changing the status to On Ship:

- Creates an event On Ship;
- The treatment of the Container is now considered completed;
- The global status now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

IMPORTANT: If the Container is assigned to a Trucking Company, each report of release or hold, and any changes that affect the Red or Green status will generate an alert to the Trucking Company related to the Container.

OUTPUT:

- Updates Extranet database with releases and status reported by the Terminal;
- Displays a confirmation message to the Terminal.

Function 7 Change Container Status with Extranet Screen

3.7.2 Change Container Status with Batch Transaction

FR-07-2	**Functional Requirement Name:** Change Container Status with Batch Transaction	
Functional Focus:		**Priority:** High

Functional Requirement Definition: Receives Container Status Change transaction, validates it, updates Extranet database, and sends an acknowledgement to the Terminal.

INTRODUCTION:
One transaction may contain several status reports for one Container. If one status report is not valid, the whole transaction is rejected and no status is reported.

If a note is included in the transaction to provide more information on a specific status report, that note will be sent in an alert if required. The note can also be seen on the Container Log screen.

The Container Status Change transaction allows the Terminal to report the following for a Container:

For Import, the Terminal may perform the following actions:

1. Report a Container's Release (Customs, Agriculture, Shipping Line, or Terminal);
2. Report a Container's Hold (Customs, Agriculture, Shipping Line, or Terminal);
3. Change a Container's status to one of the following:
   a. Initial;
   b. Grounded;
   c. Gate Out.

For Export, the Terminal may perform the following action:

4. Change a Container's status to one of the following:
   a. Initial;
   b. In Gate;
   c. On Ship.

For more information, see **Description** in section 3.7.

FR-07-2	**Functional Requirement Name:** Change Container Status with Batch Transaction	
Functional Focus:		**Priority:** High

INPUT:
Transaction sent by the Terminal and reformatted by the translator (see Transaction: Container Status Change format).

Prerequisites:

- The Shipping Line must have sent the related Voyage Description and Bill of Lading transaction to the Extranet;
- In the Voyage Description transaction sent by the Shipping Line, the name of the related Terminal must be included. The Terminal sending the transaction must be the one appearing in the Voyage Description transaction.

PROCESSING:

General information about a transaction:

Validation rules:

- The Container for the related Voyage must exist in the Extranet (Vessel name + Voyage number + Container number);
- If the Voyage is for import, the status reported must be one of the following: Release or Hold for Customs, Agriculture, Shipping Lines or Terminal, or it can be Initial, Grounded, or Out Gate;
- If the Voyage is for Export, the status reported must be one of the following: Initial, In Gate, or On Ship;
- The Terminal related to the Container in the Extranet (as sent in the Voyage Description transaction) must be the one sending the transaction.

1. Report a Release (change value to OK for one of the four possible releases):
It must be reported when one of the stakeholders releases a Container (Customs, Agriculture, Shipping Line, or Terminal).

Impact of reporting a release:

- If the release was the last thing detaining the Container (all other releases are OK and status is Grounded), the Container now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table for the related Container for that event (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

2. Report a Hold (change value to Hold for one of the four releases):
It must be reported if one of the stakeholders (Customs, Agriculture, Shipping Line, or Terminal) decides to put a hold on the Container.

Impact of reporting a Hold:

- The Container now appears as red in all related lists.

Database modifications:

- Updates the corresponding entry in the Actual Event table to indicate the cancellation of the release (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

3. Report a status for import Container:
The Terminal will be able to choose one of the following three values: Initial, Grounded, or Gate Out.

FR-07-2	**Functional Requirement Name:** Change Container Status with Batch Transaction	
Functional Focus:		**Priority:** High

3a. Changing the status to Initial

Initial is the default value of a Container, but if a Grounded or Gate Out status iss reported by mistake, the status can be changed back to Initial.

Impact of changing the status to Initial:

- Cancels existing Grounded or Gate Out event;
- If previously complete, the treatment of the Container is not considered completed anymore;
- The global status now appears as red in all related lists.

Database modifications:

- Updates entries in the Actual Event table for the related Container by changing the Event Grounded or Gate Out and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id);

3b. Changing the status to Grounded

It must be reported when the Container is moved from the Ship to the Berth by Terminal staff. If a Gate Out status is reported by mistake, it can be changed back to Grounded.

Impact of changing the status to Grounded:

- Cancels existing Gate Out event;
- Creates an event Grounded;
- If all releases are OK, the Container now appears as green in all related lists.

Database modifications:

- If needed, updates entries in the Actual Event for the related Container by changing the event Gate Out and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id);
- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

3c. Changing the status to Gate Out

It must be reported when the Truck Driver leaves the Terminal with the import Container.

Impact of changing the status to Gate Out:

- Creates an event Gate Out;
- The treatment of the Container is now considered completed;
- The global status now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

4. Report a status for export Container:

The Terminal will be able to choose one of the following three values: Initial, In Gate, or On Ship.

4a. Changing the status to Initial

Initial is the default value of a Container, but if an In Gate or On Ship status is reported by mistake, the status can be changed back to Initial.

FR-07-2	**Functional Requirement Name:** Change Container Status with Batch Transaction
Functional Focus:	**Priority:** High

Impact of changing the status to Initial:

- Cancels existing In Gate or On Ship event;
- If previously complete, the treatment of the Container is not considered completed anymore;
- The global status now appears as red in all related lists.

Database modifications:

- Update entries in the Actual Event table for the related Container by changing the event In Gate or On Ship and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

4b. Changing the status to In Gate

It must be reported when the Truck Driver reaches the Terminal Gate with the export Container. If an On Ship status is reported by mistake, it can be changed back to In Gate.

Impact of changing the status to In Gate:

- Cancels existing On Ship event;
- Creates an event In Gate;
- The global status now appears as green in all related lists.

Database modifications:

- If needed, updates entries in the Actual Event table for the related Container by changing the event On Ship and reporting the cancellation (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id);
- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

4c. Changing the status to On Ship

It must be reported when the Container is loaded onto the Ship by Terminal staff.

Impact of changing the status to On Ship:

- Creates an event On Ship;
- The treatment of the Container is now considered completed;
- The global status now appears as green in all related lists.

Database modifications:

- Creates an entry in the Actual Event table to report the status of the related Container (key: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id + avtlevt id).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 501: Transaction rejected, Container number for the specific Voyage does not exist in the Extranet;
- Reason code = 502: Transaction rejected, incorrect status report for an Import;
- Reason code = 503: Transaction rejected, incorrect status report for an Export;
- Reason code = 504: Transaction rejected, Terminal not related to the Voyage.

IMPORTANT: Each report of release or hold, and any changes that affect the Red or Green status will generate an alert to the Trucking Company related to the Container.

FR-07-2	**Functional Requirement Name:** Change Container Status with Batch Transaction
Functional Focus:	**Priority:** High

5. Additional validations:

Here are additional validations not related to one specific transaction type.

Validation rules:

- The Transaction ID must be 'CS' for Change container Status;
- The transaction type must be 'R' for Report.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

OUTPUT:

- Updates Extranet database for Container Status Change transactions, if it is valid;
- Sends an acknowledgement to the Terminal.

Function 8 Change Container Status with Batch Transaction

Transaction: Container Status Change format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'CS'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'R' for Report	N/A
Reference No	Number generated by Terminal, sent back in acknowledgement by the Extranet.	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of Terminal sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary

Field	**Description**	**Optional / Mandatory**	**Format**	**Length**	**Values**	**DB table**
Number of reporting	Number of status change reports included in the transaction	Mandatory	Numeric	2		N/A
For each report						
Actlevt_cd	Type of event reported 'rlcc': release Canada Customs 'rlac': release Agriculture Canada 'rlsl': release Shipping Line 'rlpt': release Terminal 'hdcc': hold Canada Customs 'hdac': hold Agriculture Canada 'hdsl': hold Shipping Line 'hdpt': hold Terminal 'grpt': grounded 'ogpt': out gate from Terminal 'igpt': in gate at Terminal 'onsl': on board ship.	Mandatory	Alphanum.	4	See description	Actual event
Actlevt_notes	Notes related to the event reported	Optional	Alphanum.	From 1 to 1024		Actual Event

Table 6 Container Status Change Format

3.8 Assign Truck Driver to Container

Description: Each Container in the Extranet must be assigned to a Truck Driver. The assignment must be done for import Containers as well as for export Containers and consists of specifying the Truck Driver, transport instructions, and date of transport. This assignment will issue an Instruction to Truck Driver that will be given to the Truck Driver.

In the Extranet, the Freight Forwarder assigns Trucking Companies. The next step is for the Trucking Company to assign a Truck Driver to the Container.

The purpose of performing an Assign Truck Driver to Container is to allow the Trucking Company to assign the Truck Driver who will be responsible for handling the Container and to provide a related Instruction to Truck Driver for the Container. An Instruction to Truck Driver includes a completion date and free-form instructions. Free-form instructions contain information that the Trucking Company must give to the Truck Driver to handle the Container.

An Instruction to Truck Driver may include one or several subinstructions. The Instruction to Truck Driver given to the Truck Driver includes general instructions for several Containers plus subinstructions specific to each Container.

Initially, each Instruction to Truck Driver defined by a Trucking Company will only be allowed to include one subinstruction because treatment in the Extranet is done on a single Container basis. Although the database model is designed to manage Instructions to Truck Driver and subinstructions, the current application is not. For a truck transporting two Containers, it may be managed in the Extranet as two separate Instructions to Truck Driver assigned to the same Truck Driver.

Once the Instruction to Truck Driver is created in the Extranet, it is available to be printed. The Trucking Company that created it may want to print it to keep track of the work it assigned or to give it to the Truck Driver. The Driver Assignment Detail screen allows the instructions to be printed.

The information provided in the Truck Driver assignment is useful for the Terminal to authenticate the Truck Driver at the gate. The Truck Driver Assignment Detail screen allows the Terminal to access the Truck Driver's information. Usually, the name and picture of the Truck Driver will be available for authentication. In the case of a temporary Truck Driver, when it is not possible to have a picture in the Extranet, the name of the Truck Driver will still be available and the Terminal staff will have to ask the Truck Driver for proof of identity (driver's licence or other picture ID).

Who provides the information: The Trucking Company is responsible for providing Truck Driver assignments to the Extranet for every Container on each import and export Voyage. The Freight Forwarder assigns responsibility of the specific Containers to the Trucking Company.

When is the information supplied to the Extranet: The information must be available in the Extranet before the truck reaches the gate at the Terminal.

How is the information provided: The Trucking Company may choose the best way to supply the information, either on-line using the Extranet screen or by sending a batch transaction.

3.8.1 Assign Truck Driver to Container with Extranet Screen

FR-08-1	**Functional Requirement Name:** Assign Truck Driver to Container with Extranet Screen	
Functional Focus:		**Priority:** High

Functional Requirement Definition: The Trucking Company accesses the Extranet screen and assigns a Truck Driver to a Container.

INTRODUCTION:
The Truck Driver Assignment Detail screen allows the Trucking Company to perform the following actions (the screen is accessible through the Container Detail screen):

1. Assign a Truck Driver to a Container (no Truck Driver previously assigned);
2. Assign a Truck Driver to a Container (another Truck Driver previously assigned);
3. Cancel the current Truck Driver assignment.

For more information, see **Description** in section 3.8.

INPUT:
Information keyed in and submitted by the Trucking Company to the Extranet screen.

Prerequisites:

- The Shipping Line must have sent the related Voyage Description and Bill of Lading transactions to the Extranet;
- The Container must be assigned to the proper Trucking Company. The Freight Forwarder is responsible for this assignment using the Trucking Company Assignent screen or an Assign Trucking Company to Container transaction. otherwise the Trucking Company will not be able to retrieve the Container in the Extranet;
- The related Truck Driver must exist in the Extranet because the name must be selected from a pre-existing list. If the Truck Driver does not appear on this list, the Trucking Company may add the name using the Manage Driver screen.

PROCESSING:

1. Assign a new Truck Driver (with actions 1 or 2):

Impact of the assignment:

- Terminal staff at the gate will be able to authenticate the Truck Driver wanting to enter;
- The name of the Truck Driver now appears on the Container Detail screen with a link to the Truck Driver Assignment Detail screen.

Database modifications:

- Creates a new Instruction (Instruction to Truck Driver and Subinstruction tables) for the Truck Driver related to the Order for a specific Container:
    - Creates Instruction to Truck Driver: tk actr id + tk drvr actr id + drvr employee id + instr id (generated);
    - Creates Subinstruction for the Instruction to Truck Driver just created in relation to the existing Standard Suborder: tk actr id + instr id + subinstr id (generated) + ff actr id + ordr id + stdsubord line nbr.

2. Cancel the assignment of a Truck Driver (with actions 2 or 3):

Impact of the cancellation:

- The information to authenticate the Truck Driver at the gate by Terminal staff is no longer available;

FR-08-1	**Functional Requirement Name:** Assign Truck Driver to Container with Extranet Screen
Functional Focus:	**Priority:** High

- The name of the Truck Driver no longer appears on the Container Detail screen; it is either replaced by another name, or deleted entirely.

Database modifications:

- Deletes the old Instruction (Instruction to Truck Driver and Subinstruction tables) for the Truck Driver related to the Order for a specific Container:
    - Deletes Subinstruction related to the Standard Suborder: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id;
    - Deletes Instruction to Truck Driver for the Subinstruction just deleted: tk actr id + instr id.

OUTPUT:

- Updates Extranet database with the Truck Driver assignment created, modified, or cancelled by the Trucking Company;
- Displays a confirmation message on the Extranel screen for the Trucking Company.

Function 9 Assign Truck Driver to Container with Extranet Screen

3.8.2 Assign Truck Driver to Container with Batch Transaction

FR-08-2	**Functional Requirement Name:** Assign Truck Driver to Container with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Truck Driver Assignment transaction, validates it, updates the Extranet database, and sends an acknowledgement to the Trucking Company.

INTRODUCTION:
The Truck Driver Assignment transaction allows the Trucking Company to perform the following actions:

1. Add a new Truck Driver assignment for a Container;
2. Modify an existing Truck Driver assignment;
3. Cancel an existing Truck Driver assignment.

For more information, see **Description** in section 3.8.

INPUT:
Transaction sent by the Trucking Company and reformatted by the translator (see Transaction: Truck Driver Assignment Format).

Prerequisites:

- The Shipping Line must have sent the related Voyage Description and Bill of Lading transactions to the Extranet;
- The Container must be assigned to the proper Trucking Company. The Freight Forwarder is resoponsible for this assignement using the Trucking Company Assignment screen or an Assign Trucking Company to Container transaction, otherwise the Trucking Company will not be able to retrieve the Container in the Extranet;
- The related Truck Driver must exist in the Extranet because the name must be selected from a pre-existing list. If the Driver does not appear on this list, the Trucking Company may add the name using the Manage Driver screen.

FR-08-2	**Functional Requirement Name:** Assign Truck Driver to Container with Batch Transaction
Functional Focus:	**Priority:** High

PROCESSING:

1. **Add a new Truck Driver assignment:**

Validation rules:

- The related Container must exist in the Extranet (Vessel name + Voyage number + Container number);
- An Order must exist for the proper Trucking Company. The Container (Vessel name + Voyage number + Container number) must have an Order (Standard Suborder, Order to Carrier) related to the Trucking Company (stakeholder identifier) sending the transaction;
- The Truck Driver must exist in the Extranet for the related Trucking Company;
- A Truck Driver assignment must not exist for the related Container. There is already an assignment if the Container (Vessel name + Voyage number + Container number) has an Order (standard suborder) that is already related to an existing Instruction (standard subinstruction).

Impact of the assignment:

- Terminal staff at the gate will be able to authenticate the Truck Driver wanting to enter;
- The name of the Truck Driver now appears in the Container Detail screen with a link to the Truck Driver Assignment Detail screen.

Database modifications:

- Creates a new Instruction (Instruction to Truck Driver and Subinstruction tables) for the Driver related to the Order for a specific Container;
    - Creates Instruction to Truck Driver: tk actr id + tk drvr actr id + drvr employee id + instr id (generated).
- Creates Subinstruction for the Instruction to Truck Driver just created in relation to the existing Standard Suborder: tk actr id + instr id + subinstr id (generated) + ff actr id + ordr id + stdsubord line nbr.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 601: Transaction rejected, Container for the specific Voyage does not exist in the Extranet;
- Reason code = 602: Transaction rejected, Order for the Trucking Company sending the transaction does not exist in the Extranet for the specific Container;
- Reason code = 603: Transaction rejected, Truck Driver does not exist in the Extranet;
- Reason code = 604: Transaction rejected, Truck Driver assignment for that Container already exists.

2. **Modify an existing Truck Driver assignment:**

Validation rules:

- An Order must exist for the proper Trucking Company. The Container (Vessel name + Voyage number + Container number) must have an Order (Standard Suborder, Order to Carrier) related to the Trucking Company (stakeholder identifier) sending the transaction;
- The Truck Driver assignment must exist for the related Container. The Container (Vessel name + Voyage number + Container number) must have an Order (Standard Suborder) that has a related Instruction (standard subinstruction);
- If the Truck Driver is changed, the new one must exist in the Extranet for the related Trucking Company.

FR-08-2	**Functional Requirement Name:** Assign Truck Driver to Container with Batch Transaction	
Functional Focus:		**Priority:** High

Impact of modifying the assignment:

- Modifications are reflected in the Container Detail and Truck Driver Assignment Detail screens.

Database modifications:

- Updates the instructions to the Truck Driver (Instruction to Truck Driver and Standard Subinstruction tables);
- If the Truck Driver is changed, changes the relation to Truck Driver table.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 602: Transaction rejected, Order to Trucking Company sending the transaction does not exist in the Extranet for the specific Container;
- Reason code = 603: Transaction rejected, Truck Driver does not exist in the Extranet;
- Reason code = 605: Transaction rejected, Truck Driver assignment for that Container does not exist.

3. Cancel a Truck Driver assignment:

Validation rules:

- An order must exist for the proper Trucking Company. The Container (Vessel name + Voyage number + Container number) must have an Order (Standard Suborder, Order to Carrier) related to the Trucking Company (stakeholder identifier) sending the transaction;
- The Truck Driver assignment must exist for the related Container. The Container (Vessel name + Voyage number + Container number) must have an Order (Standard Suborder) that has a related Instruction (standard subinstruction).

Impact of the cancellation:

- The information to authenticate the Truck Driver at the gate by Terminal staff is no longer available;
- The name of the Truck Driver no longer appears on the Container Detail screen, and the relation to the Truck Driver Assignment Detail screen will no longer be available.

Database modifications:

- Deletes the old Instruction (Instruction to Truck Driver and Subinstruction tables) for the Truck Driver related to that Order:
    - Deletes Subinstruction related to the Standard Suborder: vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id.
    - Deletes Instruction to Truck Driver for the Subinstruction just deleted: tk actr id + instr id.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 602: Transaction rejected, Order to Trucking Company sending the transaction does not exist in the Extranet for the specific Container;
- Reason code = 605: Transaction rejected, Truck Driver assignment for that Container does not exist.

4. Additional validations:

Here are additional validations not related to a specific transaction type.

FR-08-2	**Functional Requirement Name:** Assign Truck Driver to Container with Batch Transaction
Functional Focus:	**Priority:** High

Validation rules:

- The Transaction ID must be 'DA' for Truck Driver Assignment;
- The transaction type must be 'A' for Add, 'M' for modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

OUTPUT:

- Updates Extranet database for the Truck Driver Assignment transaction, if it is valid;
- Sends an acknowledgement to the Trucking Company.

Function 10 Assign Truck Driver to Container with Batch Transaction

Transaction: Truck Driver Assignment format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'DA'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
Reference No	Number generated by Trucking Company, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of Trucking Company sending the transaction	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Drvr_employee_id	Employee number of Truck Driver	Mandatory	Alphanum.	10		Truck Driver
Instr_truck_assigned	Truck number that will be used for the assignment	Optional	Alphanum.	30		Instruction to Truck Driver
Instr_dt	Date expected to complete Instruction related to Container	Mandatory	Date	8	yyyymmdd	Instruction to Truck Driver
Stdinstr_note	Transport instructions given by Trucking Company to Truck Driver	Mandatory	Alphanum.	From 1 to 1024		Standard instruction

Table 7 Truck Driver Assignment Format

3.9 Manage Drivers

Description: If a Trucking Company wishes to be able to assign Truck Drivers to Containers, the Truck Drivers must exist in the Extranet database. In the Extranet, permanent employees and independent truck drivers are treated the same way.

Information related to the Truck Driver consists of the Truck Driver's name, employee number, and picture (if available).

Photographs provided by Trucking Companies will be saved and kept on the Extranet's database server. Two formats will be allowed for photos: JPG and GIF. At the implementation phase, specifications for photo size will be provided.

Information to indicate a Truck Driver's status (active or inactive) will be available and may be useful for Truck Drivers who work on an irregular basis for a Trucking Company. Truck Drivers who leave a Trucking Company temporarily can be deactivated instead of deleted. When deactivated, a Truck Driver cannot be assigned to Containers. When a Truck Driver returns, the Trucking Company can reactivate the file instead of having to re-enter all the Truck Driver's information.

To delete or deactivate a Truck Driver from the Extranet database, that driver cannot be currently assigned to any Containers. If the Truck Driver is assigned to a Container and the treatment has not been completed, the deletion or deactivation is denied. If the Trucking Company really wants to delete or deactivate a Truck Driver assigned to a Container, the Truck Driver assignment must first be cancelled using the Truck Driver Assignment Detail screen or an Assign Truck Driver to Container transaction.

Who provides the information: The Trucking Company is responsible for adding, modifying, or deleting its own Truck Drivers.

When is the information supplied to the Extranet: The information must be supplied as soon as a Truck Driver who handles Containers for the Port of Montreal is hired, fired, laid off, or whose file requires changes to be made.

How is the information provided: The function must be performed on-line using the Extranet screen. The Manage Driver screen allows the Trucking Company to perform the following tasks (the screen is accessible through the side menu):

1. Add a Truck Driver to the database with related information;
2. Modify information of an existing Truck Driver who works for the Trucking Company performing the action;
3. Delete an existing Truck Driver who works for the Trucking Company performing the action.

3.9.1 Manage Drivers with Extranet Screen

FR-09-1	**Functional Requirement Name:** Manage Drivers with Extranet Screen
Functional Focus:	**Priority:** High
Functional Requirement Definition: The Trucking Company accesses the Extranet screen and adds, modifies, or deletes a Truck Driver. **INTRODUCTION:** For more information, see **Description** in section 3.9.	

FR-09-1	**Functional Requirement Name:** Manage Drivers with Extranet Screen	
Functional Focus:		**Priority:** High

INPUT:
Information keyed in and submitted by the Trucking Company to the Extranet screen.

Prerequisites:

- To be modified or deleted, a Truck Driver must first exist in the Extranet. To perform a modification or deletion, the Trucking Company logged on must be the Trucking Company for which the Truck Driver works;
- The deletion of a Truck Driver is not allowed if that driver is currently assigned to a Container. To be able to delete that Truck Driver, the existing assignment must be cancelled by the Trucking Company, using the Truck Driver Assignment Detail screen or an Assign Truck Driver to Container transaction.

PROCESSING:

1. Add a new Truck Driver:

Validation rule:

- Employee number must be unique relative to the Trucking Company logged on (field drvr_employee_id in the table Truck_Driver).

Impact of the creation:

- The Truck Driver now appears on the Truck Driver assignment list that will be used by the related Trucking Company.

Database modifications:

- Creates an entry in the Truck Driver table in relation to the Trucking Company.
    - Key: tk drvr actr id + drvr employee id.

Possible error message displayed on the screen:

- E101: Driver already exists for "*name of Trucking Company*".

2. Modify a Truck Driver's information:

Impact of modifying a Truck Driver's information:

- If the Truck Driver is assigned to a Container, the information displayed on the Truck Driver Assignment screen will reflect the change.

Database modifications:

- Updates the corresponding entry in the Truck Driver table.
    - Key: tk drvr actr id + drvr employee id.

3. Delete a Truck Driver:

Validation rules:

- If the Truck Driver is assigned to an active Container, the deletion is declined. An active Container is a Container for which treatment has not been completed.

Impact of deleting a Truck Driver:

- The Truck Driver no longer appears on the Truck Driver assignment list used by the related Trucking Company.

FR-09-1	**Functional Requirement Name:** Manage Drivers with Extranet Screen
Functional Focus:	**Priority:** High

Database modifications:

- Deletes the corresponding entry in the Truck Driver table.
    - Key: tk drvr actr id + drvr employee id.

Possible error message displayed on the screen:

- E102: Driver is currently assigned to a Container and cannot be deleted.

OUTPUT:

- Updates Extranet database with the Truck Driver assignment made by the Trucking Company;
- Displays a confirmation message on the Extranet screen for the Trucking Company.

Function 11 Manage Drivers with Extranet Screen

3.10 Alerts

When important modifications occur in the Extranet, e-mail messages are sent to notify the users involved. An alert can also be sent if the system identifies Containers for which some information is missing (e.g., Trucking Company assignment). In that situation, an alert would be sent to remind the stakeholder that certain information needed to be provided to the Extranet. The batch job Voyage State Evolution Process is responsible for identifying these Containers.

Alerts defined in this section are the minimal requirements. Upon implementation, it will be possible to define supplementary alerts (e.g., alerts for government agencies).

Each stakeholder defined in the Extranet must provide two e-mail addresses at the time of registration. The system administrator defines these addresses in the Extranet. E-mail address fields may contain cellular telephone or text pager numbers. This could be a useful feature; however, it will not handle e-mail format conversions or supply supplementary equipment to trigger cell phone or pager calls. This is beyond the scope of this design.

When an event requiring an alert occurs, the system will retrieve related e-mail addresses, generate the alert, and send it to these e-mail addresses.

In this section, all events that generate alerts are listed by type of user. A brief description is given of the contents of the alert.

The three stakeholders that may receive alerts are the Terminal, the Freight Forwarder, and the Trucking Company. Changes may occur in the Extranet that have a direct impact on these stakeholders. The changes may also interest other stakeholders (Shipping Line, Government, etc.), who may view the information using the Extranet screen and note changes that have occurred, but who do not need to receive alerts.

3.10.1 Alerts for Terminal

Events that have a significant impact on Terminals are related to the planned Voyages. Cancellation of a Voyage and changes to planned dates are important for Terminals.

If a Container is identified by the system as having no release or status reported by the Terminal, an alert is sent to the Terminal if one of the following two conditions occurs:

1. for an import Container, the Ship has arrived;
2. for an export Container, the ship is scheduled to leave the following day.

The Shipping Line sends transactions to the Extranet to define Voyages and Bills of Lading with related Containers. If, **for exceptional reasons**, the information sent is erroneous, and the Shipping Line decides to cancel that information and recreate it in the Extranet, it may have an impact on the Terminal. If Containers are deleted in the Extranet, the Terminal must be notified, as it may have sent releases or status changes related to deleted Containers. Several events in the Extranet allow Container deletion: Cancellation of a Voyage, Cancellation of a Bill of Lading, and Deletion of a specific Container from a Bill of Lading, all of which occur following a transaction sent by the Shipping Line.

If the Shipping Line deletes and recreates a Container, the information provided to the Extranet by the Terminal is lost. The Terminal must send or resend status for deleted Containers.

LIST OF EVENTS GENERATING AN ALERT TO TERMINAL

1. **Change the date of a Voyage (arrival date for import Voyage or departure date for export Voyage) – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Terminal related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, previous Voyage date, and new Voyage date.

2. **Cancel a Voyage – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Terminal related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, and Voyage date.

3. **Cancel a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Terminal related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, and a list of Container numbers that were included on the Bill of Lading.

4. **Remove a Container from a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Terminal related to the Voyage of the Container;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date and the Container number.

5. **No release or status reported:**
   - An alert with a descriptive message is sent to the Terminal for the specific Container;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

3.10.2 Alerts for Freight Forwarder

Events that have a significant impact on Freight Forwarders are related to Containers included on the Bill of Lading for which they are responsible. If Containers are added, modified, or deleted on a Bill of Lading, it may affect the Assignment to Trucking Company. Cancellation of a Voyage and changes to planned dates may also have a direct impact on Freight Forwarders. In the export process the Freight Forwarder also manages Empty Memos for specific Voyages to provide information on how to handle empties. For an export Voyage, it is very important to alert the Freight Forwarder if the planned dates are changed or if the Voyage is cancelled.

If a Container is identified by the system as having no Trucking Company assigned by the Freight Forwarder, an alert is sent to the Freight Forwarder if one of the following two conditions occurs:

1. for an import Container, the Ship has arrived;
2. for an export Container, the Ship is scheduled to leave the following day.

The system will also send an alert if the storage date for an import Container is the following day. The alert will prevent unnecessary costs.

The Shipping Line sends transactions to the Extranet to define Voyages and Bills of Lading with related Containers. If, **for exceptional reasons**, the information sent is erroneous, and the Shipping

Line decides to cancel that information and recreate it in the Extranet, it may have an impact on the Shipping Line. If Containers are deleted in the Extranet, the Freight Forwarder must be notified, as it may have assigned the deleted Containers to Trucking Companies. Several events in the Extranet allow Container deletion: Cancellation of a Voyage, Cancellation of a Bill of Lading, and Deletion of a specific Container from a Bill of Lading, all of which occur following a transaction sent by the Shipping Line.

If the Shipping Line deletes and recreates a Container, the information provided to the Extranet by the Freight Forwarder is lost. The Freight Forwarder must provide the information again.

LIST OF EVENTS GENERATING AN ALERT TO FREIGHT FORWARDER

1. **Change the date of a Voyage (arrival date for import Voyage or departure date for export Voyage) – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Freight Forwarder with at least one Bill of Lading or one Empty Memo (for export) related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, previous Voyage date, new Voyage date, a list of affected Bills of Lading, and a list of affected Empty Memos (if it is an export Voyage).

2. **Cancel a Voyage – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the related Freight Forwarder for all Bills of Lading and Empty Memos (for export) related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, a list of affected Bills of Lading, and a list of effected Empty Memos (if it is an export Voyage).

3. **Add, modify, or delete a Container on a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Freight Forwarder related to the Container's Bill of Lading;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, Bill of Lading number, and Container number.

4. **Cancel a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the Freight Forwarder related to the Bill of Lading;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, and Bill of Lading number.

5. **Change the Freight Forwarder related to a Bill of Lading – done by the Shipping Line:**

If the Shipping Line sends a transaction that changes the Freight Forwarder related to a specific Bill of Lading, the previous Freight Forwarder must be notified. It is the same situation as with a Cancel a Bill of Lading event described in the previous point (4).

6. **No Trucking Company assigned:**

If no Trucking Company is assigned to a Container, an alert is sent if one of the following two conditions occurs:

1. for an import Container, status is Grounded;
2. for an export Container, the ship has arrived at the port.

- An alert with a descriptive message is sent to the Freight Forwarder related to the specific Container;
- E-mail addresses and language code are retrieved from the database;
- The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

7. **Approaching Storage Date:**

If the storage date for a container is the following day, an alert is sent.

- An alert with a descriptive message is sent to the Freight Forwarder related to the specific Container;
- E-mail addresses and language code are retrieved from the database;
- The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

3.10.3 Alerts for Trucking Company

Events that have a significant impact on Trucking Companies are related to Container assignments and Empty Memos assigned to them by Freight Forwarders. Any Container release or status change reported by the Terminal is important for Trucking Companies.

To avoid sending too many alerts, only status or release changes affecting the global status of the Container will generate an alert to a Trucking Company. In addition, only events that cancel the assignment of a Trucking Company will generate alerts to that Trucking Company. It is important that Trucking Companies be notified that they are no longer responsible for handling a specific Container.

Several events, such as Cancellation of a Voyage, Cancellation of a Bill of Lading, and Deletion of a specific Container from a Bill of Lading, have the same impact on a Trucking Company as deleting a Container. If Containers related these events are assigned to Trucking Companies, an alert is sent to them. If the Shipping Line sends a Bill of Lading transaction changing the Freight Forwarder related to a specific Bill of Lading, all existing Trucking Company assignments are deleted because they were provided by the previous Freight Forwarder.

The cancellation of an export Voyage results in the deletion of related Empty Memos. In that case, the related Trucking Company receives an alert.

If a Container is identified by the system as having no Truck Driver assigned by the Trucking Company, an alert is sent to the Trucking Company if one of the following two conditions occurs:

1. for an import Container, the Ship has arrived;
2. for an export Container, the Ship is scheduled to leave the following day.

The system will also send an alert if the storage date for an import Container is the following day. The alert will prevent unnecessary costs.

The Shipping Line and the Freight Forwarder provide information to the Extranet that has a direct impact on the Trucking Company. If, **for exceptional reasons**, the information sent is erroneous, and the Shipping Line or Freight Forwarder decides to cancel that information and recreate it in the Extranet, it may have an impact on the Trucking Company.

If the Shipping Line deletes and recreates a Container, the information provided to the Extranet by the Trucking Company is lost. If the Freight Forwarder deletes and recreates an assignment, the information provided to the Extranet by the Trucking Company is also lost. The Trucking Company must provide the information (i.e., Truck Driver assignment) again.

LIST OF EVENTS GENERATING AN ALERT TO TRUCKING COMPANY

1. **Change the date of a Voyage (arrival date for import Voyage or departure date for export Voyage) – done by the Shipping Line:**
   - An alert with a descriptive message is sent to all Trucking Companies assigned to at least one Container or one Empty Memo related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, previous Voyage date, new Voyage date, a list of affected Container numbers, and a list of affected Empty Memos.

2. **Cancel a Voyage – done by the Shipping Line:**
   - An alert with a descriptive message is sent to all Trucking Companies assigned to at least one Container or one Empty Memo related to the Voyage;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, a list of affected Container numbers, and a list of affected Empty Memos.

3. **Change the Freight Forwarder related to a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to all trucking Companies assigned to at least one Container on the Bill of Lading;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, Bill of Lading number, and a list of Container numbers.

4. **Delete a Container on a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to the related Trucking Company if the Container is assigned to a Trucking Company;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

5. **Cancel a Bill of Lading – done by the Shipping Line:**
   - An alert with a descriptive message is sent to all trucking Companies assigned to at least one Container on the Bill of Lading;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, and a list of Container numbers.

6. **Cancel a Trucking Company assignment to a Container – done by the Freight Forwarder:**
   - An alert with a descriptive message is sent to the Trucking Company assigned to the Container;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, Order number, and Container number.

7. **Delete an Empty Memo – done by the Freight Forwarder:**
   - An alert with a descriptive message is sent to the Trucking Company related to the Empty Memo;
   - E-mail addresses and language code are retrieved from the database;
   - The alert includes: Vessel name, Voyage number, Voyage date, Booking number, and expected completion date.

8. Change Container status or release – done by the Terminal:
If a change in status or release affects the global status of an import Container, an alert is sent. The global status may change from Green (ready to be picked up) to Red (not ready to be picked up) or vice versa.

- An alert with a descriptive message is sent to the related Trucking Company if the Container is assigned to a Trucking Company;
- E-mail addresses and language code are retrieved from the database;
- The alert includes: Vessel name, Voyage number, Voyage date, Order number, and Container number.

9. No Truck Driver assigned:

- An alert with a descriptive message is sent to the Trucking Company related to the specific Container;
- E-mail addresses and language code are retrieved from the database;
- The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

10. Approaching Storage Date:
If the storage date for a container is the following day, an alert is sent.

- An alert with a descriptive message is sent to the Trucking Company related to the specific Container;
- E-mail addresses and language code are retrieved from the database;
- The alert includes: Vessel name, Voyage number, Voyage date, and Container number.

3.10.4 Generate Alert Process

FR-10-4	**Functional Requirement Name:** Generate Alert Process
Functional Focus:	**Priority:** High

Functional Requirement Definition: Sends an alert to a specific stakeholder: following an event that generates an update having a direct impact on that stakeholder; or if the system detects that information is missing for a Container for which a deadline is approaching.

INTRODUCTION:
This process occurs when a situation arises that necessitates an alert. See sections 3.10, 3.10.1, 3.10.2, and 3.10.3 for more information on how situations resulting in an alert occur.

INPUT:
After the need for an alert is detected, the process begins with stakeholder identification, type of alert required, and identification of the element that the alert (Voyage, Bill of Lading, or Container). The event detecting missing information may be a batch transaction, an on-line event on the Extranet screen, or the Voyage State Evolution batch process (see section 3.11.1).

PROCESSING:

- Retrieves e-mail addresses and language code for all stakeholders identified by event;
- Generates the alert with information received and a pre-formatted message;
- Sends the alert.

OUTPUT:

- An e-mail message is sent to related stakeholders that includes details on the nature of the changed or missing information.

Function 12 Generate Alert Process

3.11 Cleaning and Archiving Database

Once the Extranet is in place and operational, Voyage descriptions, Bills of Lading, and Containers will be added to the database every day. Freight Forwarders and Trucking Companies will add and manage all kinds of information related to each Voyage's Containers.

A solution must be in place to clean the database regularly by removing information that is no longer required, otherwise the database would grow indefinitely.

To decide what to do with all the information in the database, the state of each Voyage must be determined: Voyage not completed, Voyage completed, Voyage abnormally incomplete. The state of each Voyage is stored internally by the system. This information cannot be viewed on the regular Extranet screens.

1. Voyage not completed: Voyage in the database (export or import) for which one or several related Container treatments have not been completed.

2. Voyage completed: Voyage in the database (export or import) for which all related Container treatments have been completed.

3. Voyage abnormally incomplete: Voyage in the database (export or import) for which one or several related Container treatments have not been completed, and for which the expected **Voyage date (ETA or ETD) has past** (at least one month).

Definition of a completed Container treatment: The treatment for an import Container is completed when a Gate Out status is received. The treatment for an export Container is completed when an On Ship status is received.

It will always be possible to retrieve all the data for a Voyage. The information is kept in at least one of the following three places:

1. **Current database**: available to the Extranet application (batch transaction, screens, etc.), it includes all Voyages not completed. Voyages completed and abnormally incomplete for less than one month are also included.
2. **Reporting database**: available only for reporting, it includes all Voyages completed and abnormally incomplete for less than two years. For reporting purposes, all data in the current database is also stored in this database.
3. **Archived database on tape**: the final destination of the data for a Voyage. Voyages completed or abnormally incomplete for more than two years are stored on archived tapes.

Three batch functions are required to manage Voyage states and the content of those databases:

1. The Voyage State Evolution Process updates Voyage states and checks for missing information.
2. The Clean Current Database Process deletes completed and abnormally incomplete Voyages from the current database.
3. The Archiving Process archives the reporting database on tape and deletes Voyages older than two years in the current reporting database.

Data Life Cycle

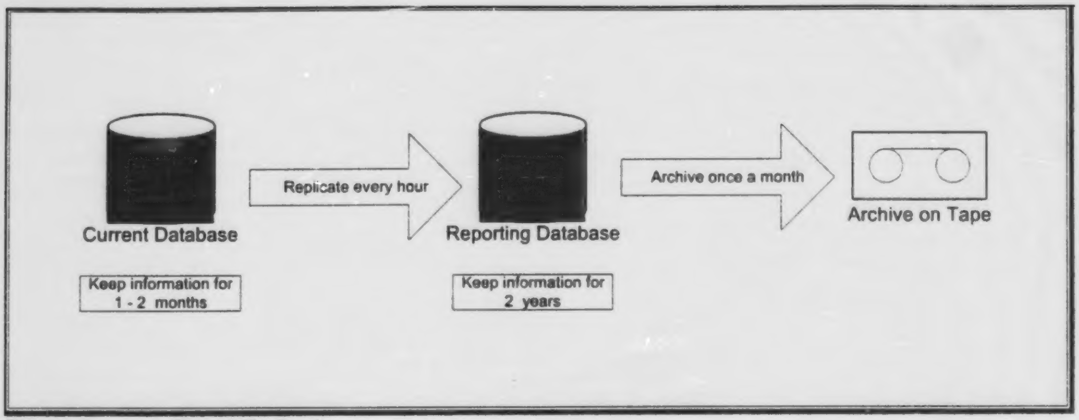


Figure 4 Data Life Cycle

3.11.1 Voyage State Evolution Process

FR-11-1	**Functional Requirement Name:** Voyage State Evolution Process
Functional Focus:	**Priority:** High

Functional Requirement Definition: Adapts the Voyage's state according to changes in the database since the process was previously performed.

INTRODUCTION:
This batch process must be performed every night, when the Extranet application is less occupied. Its main objective is to scan all Voyages that are not yet completed and update the Voyage state field. A Voyage is completed if all Container treatments related to that Voyage are completed. Since every Container must be scanned, the process will also be responsible for detecting missing information related to Containers and for sending an alert to related stakeholders.

If the Voyage completion is more than a month overdue, the state of the Voyage becomes Abnormally Incomplete.

INPUT:
A scheduler starts the process every night at 23:30, but that time can be changed since it will be a parameter. All that is required for the process is the Extranet database.

PROCESSING:

- For each Voyage identified as not completed, scans all related Containers to check whether all treatments have been completed. If so, changes the Voyage's state to complete and specifies a date of completion;
- If the Voyage has not been completed and if the Voyage's date was at least one month prior, changes the Voyage's state to Abnormally Incomplete and specifies the current date;
- Sends an alert to the related Freight Forwarder and Trucking Company if the storage date of an import Container is the following day;
- Sends an alert if the treatment of one of the scanned Containers is not complete or if some information is missing from one of the stakeholders. One of the following two conditions must also occur:

FR-11-1	**Functional Requirement Name:** Voyage State Evolution Process
Functional Focus:	**Priority:** High

1. For an import Voyage, the status of the Container has been reported Grounded today.
2. For an export Voyage, the ship is supposed to leave the following day.

Criteria for sending an alert if information is missing:

1. Terminal has not reported a release or status for the Container: sends an explicit alert to the related Terminal as a reminder that it must report events for that Container. If the Terminal reported releases or status for the wrong Container number, the alert will allow the Terminal to validate the information.
2. No Trucking Company assigned to the Container (no existing Order to Carrier): sends an explicit alert to the related Freight Forwarder as a reminder that it must assign a Trucking Company.
3. Trucking Company assigned to the Container (with an existing Order to Carrier) but no Truck Driver assigned to that Container: sends an explicit alert to the Trucking Company as a reminder that it must assign a Truck Driver.

OUTPUT:

- An alert is sent to the related stakeholder that has failed to provide certain information for a specific Container;
- The state of the Voyage is updated in the Extranet database;
- A brief execution report is sent to the Extranet administrator.

Function 13 Voyage State Evolution Process

3.11.2 Clean Current Database Process

FR-11-2	**Functional Requirement Name:** Clean Current Database Process
Functional Focus:	**Priority:** High

Functional Requirement Definition: Cleans the current database by deleting the data for completed Voyages or abnormally incomplete Voyages dating back more than one month. Static information on stakeholders that have been inactive for more than one year is also deleted.

INTRODUCTION:
This batch process must be performed once a month at night, when the Extranet application is less occupied. Its objective is to delete unnecessary Voyage data from the current database.

Once a Voyage is completed or abnormally incomplete, its data will be kept in the database for one more month, in case some users require information related to that Voyage. For example, if a Voyage is identified as completed at the end of February, it is archived at the end of February and deleted from the database at the end of March.

Once the data on a Voyage has been deleted from the current database, it is still available for reporting in the reporting database. To ensure complete reports, the reporting database also includes Voyages that exist in the current database. See section 3.14.1 for explanations on how and when a Voyage's data is replicated from the current database to the reporting database.

INPUT:
A scheduler launches the process on the last day of each month, after the Voyage State Evolution Process is performed, but the day can be changed since it will be a parameter.

FR-11-2	**Functional Requirement Name:** Clean Current Database Process
Functional Focus:	**Priority:** High

PROCESSING:

- If the Voyage has been completed or abnormally incomplete for more than a month, deletes the Voyage and all related information from the current database;
- If a stakeholder is identified as having been inactive for more than a year, deletes the stakeholder definition with related Contact Person and Name Synonym.

OUTPUT:

- The current database is cleaned of Voyages completed or abnormally incomplete for more than a month;
- A brief execution report is sent to the Extranet administrator.

Function 14 Clean Current Database Process

3.11.3 Archiving Process

FR-11-3	**Functional Requirement Name:** Archiving Process
Functional Focus:	**Priority:** Medium

Functional Requirement Definition: Removes Voyages older than two years from the reporting database and places them in archives.

INTRODUCTION:

This batch process must be performed once a month at night, when the Extranet application is less occupied. The first execution of this process would only be necessary two years after the implementation of the Extranet application.

The first objective of the process is to archive data on external devices that can later be accessed if necessary. Because the database would be relatively small, at the end of the month the content of the entire reporting database is archived onto tape.

The second objective of the process is to delete Voyages from the reporting database that are no longer required (i.e., older than two years).

INPUT:

- A scheduler launches the process on the last day of each month, but that day can be changed since it will be a parameter;
- The process uses the reporting database;
- Tapes must be accessible to write the archive.

PROCESSING:

- Transfers the content of the entire reporting database onto a tape;
- Deletes all Voyages and related information more than two years old from the reporting database.

OUTPUT:

- Tapes are produced with a self-contained database of archived Voyages of the month;
- The reporting database is cleaned of Voyages more than two years old;
- A brief execution report is sent to the Extranet administrator.

Function 15 Archiving Process

3.12 Manage Extranet's Static Information

The content of the Extranet is made up of two kinds of information:

- static information;
- dynamic information.

Dynamic information is related to containers, may change several times a day, and is useful only for short periods of time (i.e., when work related to a voyage is completed, the information is no longer useful).

Static information is related to stakeholder definitions. Once defined, this information only requires modification occasionally and can be useful for a long period of time (several years). Therefore, no function is defined in the Extranet to allow users to add, modify, or delete static information.

Each stakeholder that wants to become a member of the Extranet must be defined in the Extranet database. Information required for each stakeholder consists mainly of name and coordinates, names and coordinates of up to three contact persons, and e-mail addresses for the Extranet to send alerts.

The Extranet administrator is responsible for maintaining (add, modify, or delete) stakeholders' static information. For security reasons, the Port of Montreal must approve all requests to join the Extranet community, thus preventing unauthorized access to sensitive information. See section 6.3.3 for more information.

The following stakeholders may become members of the Extranet:

1. Terminals
2. Shipping Lines
3. Trucking Companies
4. Freight Forwarders
5. Related government departments (Customs, Agriculture)

The system administrators manage stakeholder information in the database using internal tools that are built-in features of database products (e.g., SQL Server 2000). No Extranet screens or batch transactions are designed for that function.

The procedure to modify information related to stakeholders is the same as the one used to define a new stakeholder, except that approval by the Port of Montreal is not required.

If a stakeholder leaves the Extranet community, the system administrator does not delete the information from the database as old Voyages kept in the database may have references to this stakeholder. The stakeholder is flagged as inactive and cannot be related to new Voyages. After being inactive for one year, a stakeholder is deleted from the database. Section 3.11 defines how and when a stakeholder is deleted from the database.

Here is a list of all information required by the database to define a stakeholder. Potential members of the Extranet will be asked to provide this information on electronic forms.

Stakeholder definition required information:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Gennam_name	Name of stakeholder	Mandatory	Alphanum.	60		General name

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Actr_role_cd	Type of stakeholder or actor role	Mandatory	Alphanum.	2	'TE' Terminal 'SL' Shipping Line 'FF' Freight Forwarder 'TK' Trucking Company 'GA' Government Agencies	Actor
Actr_gen_address	General address of stakeholder	Mandatory	Alphanum.	txt		Actor
Actr_gen_phone_nbr	General telephone number of stakeholder	Mandatory	Alphanum.	20		Actor
Actr_gen_fax_nbr	General fax number of stakeholder	Mandatory	Alphanum.	20		Actor
Actr_web_site	Stakeholder Web site address	Optional	Alphanum	60		Actor
Actr_gen_e-mail_address	General e-mail address of stakeholder	Mandatory	Alphanum.	50		Actor
Actr_1st_alert_e-mail_address	1st e-mail address to send alerts	Mandatory	Alphanum.	50		Actor
Actr_1st_alert_e-mail_lang_cd	Language code of 1st e-mail address for alerts	Mandatory	Alphanum	1	'1' English '2' French	Actor
Actr_2nd_alert_e-mail_address	2nd e-mail address to send alerts	Optional	Alphanum.	50		Actor
Actr_2nd_alert_e-mail_lang_cd	Language code of 2nd e-mail address for alerts	Mandatory	Alphanum	1	'1' English '2' French	Actor
Cntct_name	Name of 1st contact person	Mandatory	Alphanum.	50		Contact person
Cntct_function	Function (title) of 1st contact person	Mandatory	Alphanum.	50		Contact person
Cntct_phone_nbr	Telephone number of 1st contact person	Mandatory	Alphanum.	20		Contact person
Cntct_fax_nbr	Fax number of 1st contact person	Mandatory	Alphanum.	20		Contact person
Cntct_e-mail	E-mail address of 1st contact person	Mandatory	Alphanum.	30		Contact person
Cntct_city	City location of 1st contact person	Mandatory	Alphanum.	30		Contact person
Cntct_name	Name of 2nd contact person	Optional	Alphanum.	50		Contact person

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Cntct_function	Function (title) of 2nd contact person	Optional	Alphanum.	50		Contact person
Cntct_phone_nbr	Telephone number of 2nd contact person	Optional	Alphanum.	20		Contact person
Cntct_fax_nbr	Fax number of 2nd contact person	Optional	Alphanum.	20		Contact person
Cntct_e-mail	E-mail address of 2nd contact person	Optional	Alphanum.	30		Contact person
Cntct_city	City location of 2nd contact person	Optional	Alphanum.	30		Contact person
Cntct_name	Name of 3rd contact person	Optional	Alphanum.	50		Contact person
Cntct_function	Function (title) of 3rd contact person	Optional	Alphanum.	50		Contact person
Cntct_phone_nbr	Telephone number of 3rd contact person	Optional	Alphanum.	20		Contact person
Cntct_fax_nbr	Fax number of 3rd contact person	Optional	Alphanum.	20		Contact person
Cntct_e-mail	E-mail address of 3rd contact person	Optional	Alphanum.	30		Contact person
Cntct_city	City location of 3rd contact person	Optional	Alphanum.	30		Contact person

Table 8 Stakeholder Definition Required Information

3.13 Download Information for Trucking Company

One of the advantages of the Extranet for Trucking Companies is the option to download information from Extranet database in a file that can be used to interface with their own proprietary dispatch system.

This section describes how to download information, what kind of information can be downloaded, and the layout of the downloaded files. Interfacing the information with the Trucking Company's proprietary dispatch system is the responsibility of the Trucking Company

Information a Trucking Company may want to download relates to the Orders to Carrier. The Freight Forwarder creates that information when Containers are assigned to a Trucking Company. A specific Trucking Company can only download Orders to Carrier assigned to it by the Freight Forwarder.

Two types of downloads are available for the Trucking Company. The first type is performed when the Trucking Company uses the Extranet to assign Drivers to Containers, and then updates its proprietary dispatch system. For this, the Extranet is the master. The second type is performed when the Trucking Company uses its proprietary dispatch system to assign Drivers to Containers, and then updates the Extranet. For this, the proprietary dispatch system is the master.

1. Download information if Extranet is the master:
The Trucking Company assigns Truck Drivers to Containers using the Extranet's Truck Driver Assignment Detail screen or Truck Driver Assignment transaction. The Trucking Company's proprietary dispatch system then needs to be updated to have accurate information.

Here is the sequence of events:
1. The Freight Forwarder assigns a Trucking Company to the Container in the Extranet.
2. The Trucking Company assigns a Truck Driver to the Container in the Extranet.
3. The Trucking Company downloads an Order to Carrier with **Driver assigned**.
4. The Trucking Company updates its proprietary dispatch system with the downloaded information.

2. Download information if proprietary dispatch system is the master:
In order for theTrucking Company to be able to assign a Truck Driver to the Container using its dispatch system, it needs to receive from the Extranet the Order to Carrier for which it must assign a Truck Driver. Once the Truck Driver is assigned to the Container in the Trucking Company's proprietary dispatch system, the Extranet then needs to be updated to have accurate information. The Truck Driver Assignment Detail screen or Truck Driver Assignment transaction allow the Trucking Company to assign Truck Drivers to Containers in the Extranet.

Here is the sequence of events:
1. The Freight Forwarder assigns a Trucking Company to the Container in the Extranet.
2. The Trucking Company downloads the Order to Carrier with **no Truck Driver assigned**.
3. The Trucking Company updates its dispatch system with the downloaded information.
4. The Trucking Company assigns Truck Drivers to Containers in its dispatch system.
5. The Trucking Company sends information about the Truck Drivers assigned to Containers to the Extranet using the Truck Driver Assignment Detail screen or Truck Driver Assignment transaction.

Criteria for the download: The Trucking Company will be able to specify a range of dates for the download that correspond to the Order dates specified by the Freight Forwarder when it assigned the Trucking Company to the Container.

No verification is made by the Extranet's download function to verify whether a specific Order to Carrier has been downloaded. If a Trucking Company downloads information for the same range of dates two days in a row, the same Orders to Carrier will be downloaded.

The Orders to Carrier retrieved from the download may be related to Containers for which treatment may or may not be completed. No verification is made to check that information, as the Trucking Company may decide to download the information at a later time to update its proprietary dispatch system.

Information included in the download (one record per Order to Carrier):

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
SECTION A						
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary
Freight Forwarder name	Freight Forwarder that assigned the Trucking Company	Mandatory	Alphanum.	60		General name
Order_expected_achiev_dt	Date expected to complete transport of Container	Mandatory	Date	8	yyyymmdd	Order to Carrier
Stdordr_note	Transport instructions given by Freight Forwarder to Trucking Company	Mandatory	Alphanum.	From 1 to 1024		Standard order
SECTION B *The following fields will appear only if the type of download is* ***Order to Carrier with Driver assigned***						
Drvr_employee_id	Employee number of Truck Driver	Mandatory	Alphanum.	10		Truck Driver
Instr_truck_assigned	Truck number to be used for assignment	Optional	Alphanum.	30		Instruction to Truck Driver
instr_dt	Date expected to complete instruction related to Container	Mandatory	Date	8	yyyymmdd	Instruction to Truck Driver

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
stdinstr_note	Transport instructions given by Trucking Company to Truck Driver	Mandatory	Alphanum.	From 1 to 1024		Standard instruction

Table 9 Information Included in the Download

3.13.1 Download for Trucking Company

FR-13-1	**Functional Requirement Name:** Download for Trucking Company	
Functional Focus:		**Priority:** Medium

Functional Requirement Definition: The Extranet screen allows the Trucking Company to download Order to Carrier information.

INTRODUCTION:
For more information see section 3.13.

INPUT:
Download specification dates keyed in and submitted by the user to the Extranet screen.

PROCESSING:

Validation rule:
The End Date keyed in by the user must be greater than or equal to the Start Date keyed in by the user.

Treatment:
First selection criterion: The Orders to Carrier selected must be related to the Trucking Company corresponding to the user logged on.

Second selection criterion: The Orders to Carrier selected must have an expected completion date (field ordr_expected_achiev_dt from Order to Carrier table) within the range of dates keyed in by the user.

Scope of the download:

1. If the type of download is an Order to Carrier with Truck Drivers assigned, the selection must also include the following criterion: the Standard Suborders of the selected Order to Carrier **must be related** to Standard subinstructions included in an Instruction to Truck Driver.

   The file to download will include fields for sections A and B (see Table 9).

2. If the type of download is an Order to Carrier with no Truck Drivers assigned, the selection must also include the following criterion: the Standard Suborders of the selected Order to Carrier **must not be related** to Standard subinstructions included in an Instruction to Truck Driver. This means that no Truck Driver is assigned to the Container.

   The file to download will include fields for section A only (see table 9).

FR-13-1	**Functional Requirement Name:** Download for Trucking Company
Functional Focus:	**Priority:** Medium
OUTPUT: • A file is created with the information extracted from the Extranet database as well as the download criteria; • A feedback message is given to the user to indicate completion of the download.	

Function 16 Download for Trucking Company

3.14 Reports

A large amount of information related to Container handling is kept in the Extranet database. All this data will be useful to various stakeholders and it is important that they have the ability to produce various types of reports and lists.

A database dedicated to reporting is included in the Extranet design. The data for each Voyage will be available for reporting for a period of two years. For more information, see section 3.11.

The need to produce lists and reports will vary from one stakeholder to another. These needs will grow rapidly as soon as stakeholders begin to understand the usefulness of the information stored in the database. Although few pre-defined reports are included in the functional analysis of the Extranet, a report generator tool is available for stakeholders to define their own reports using the data to which they have access.

To improve database access, the basic, most frequently used reports will be pre-defined when the project is implemented.

Here are a few examples of what kind of reports can be produced:

- For the Freight Forwarder
    a. **Containers not assigned to Trucking Companies.** This report can be useful for a Freight Forwarder that needs to know whether a Container was assigned to a Trucking Company.
    b. **Containers with treatment completed.** This report can be useful to determine the final status of Containers.
- For the Trucking Company
    c. **Containers not assigned to Truck Drivers**. This report can be useful for the Trucking Company to know which Containers have not yet been assigned to a Truck Driver.

The report generator tool available for stakeholders will have the following minimum characteristics:

- Choice of electronic or paper report;
- Choice of producing reports on-line or at a later time;
- Easy to use by users with limited computers skills.

Several products exist on the market with the required characteristics, including Crystal Reports, Impromptu from Cognos, and Actuate. In the next phase of the project, a tool will be selected by the Port of Montreal administration.

A report generator tool is very useful; however, such a powerful tool generates a high rate of access to the database and may have a negative impact on response time for Extranet users. Therefore, the Extranet database is replicated so that access to the reporting database will have no impact on the rest of the Extranet application.

Every hour, the Extranet's primary database (used for everything except reporting) will be replicated to the reporting database. The frequency of the replication can be changed if the pilot Extranet demonstrates that one hour is too short or too long.

Note: Administrative reports related to infrastructure and telecommunications will be available by the provider. An example of an administrative report would be the number of hits on the web site.

3.14.1 Replicate Database for Reporting

FR-14-1	**Functional Requirement Name:** Replicate Database for Reporting
Functional Focus:	**Priority:** High

Functional Requirement Definition: The Extranet's batch process replicates the content of the current database to a dedicated reporting database.

INTRODUCTION:
This batch process replicates information added or modified in the current database to the reporting database. The deletion of information in the current database must not be replicated in the reporting database. The objective of the reporting database is to keep Voyage information for two years. In the current database, Voyages are cleaned out after one month.

INPUT:
The process uses the current database to retrieve information to be replicated.

PROCESSING:
Definition and configuration must be provided using the built-in features of a database product such as SQL Server 2000 to initiate replication.

- Configuration must be designed to initiate replication on a one-hour frequency;
- Configuration must be designed to specific that only information added or modified since the last replication should be replicated.

OUTPUT:

- Dedicated reporting database is updated;
- A brief execution report is sent to the Extranet administrator.

See related functions:

- Section 3.11.2;
- Section 3.11.3.

Function 17 Replicate Database for Reporting

3.15 General Information Available to Users

The new Extranet application will generate many questions. If useful information related to the Extranet is available on-line on the Extranet web site, many phone calls to the Help Desk or the Business Office can be avoided.

Two kinds of users may wish to have access to information related to the Extranet:

1. Non-members of the Extranet: A Company with connections to the Port of Montreal for Container handling may require information such as:

- How to become an Extranet member;
- The benefits of becoming an Extranet member;
- General overview of the Extranet's functions;
- Coordinates of the Extranet's Business Office for registration;
- Costs involved in becoming an Extranet member.

For this type of user, the information must be available before valid user authentication is required. Hyperlinks will be available on the Extranet's Entry Point screen (www.portmtl.com) to present this information. In addition, the same hyperlinks can be available from the Port of Montreal's website (www.port-montreal.com).

2. Members of the Extranet: A stakeholder that is already an Extranet member may require information such as:

- A general overview of the Extranet's functions;
- Specific questions on the Extranet application (FAQ section);
- Coordinates of the Extranet's Help-Desk;
- Coordinates of the Extranet's Business Office;
- What to do if changes need to be made to the member's coordinates or its contact persons' coordinates;
- Statistics on Extranet use;
- Ad hoc information related to Extranet members broadcast through a message centre. Examples:
    - "Too much ice on the St. Lawrence River, no ships will leave today."
    - "Emergency situation at Port of New York, no ships can go there today."

For this type of user, the information must be easily accessible from the Extranet application. Hyperlinks can be added to the side menu or somewhere on the screen, and must always be available.

The final decision on content, where the hyperlinks will be, and how many will be required can be made at the implementation phase. For the purposes of this report, it is important to identify that some kind of general information is required on the Extranet.

3.16 Data Information Required by the Extranet

In this section, all the information required by the Extranet to function properly is described. This is information that each participant must provide to the Extranet.

3.16.1 Data Information for Import Voyage

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
1) Voyage Description	Shipping Line	Electronic transaction (EDI , FTPS, or HTTPS) Transaction: **Voyage Description**	As soon as the information is available to the Shipping Line	Shipping Line identifier Vessel ID Voyage number Port name (Montreal) Terminal name Import indicator Arrival date Arrival time Berth at Terminal Total number of Containers handled in Montreal	**Required:** Shipping Line, Port, and Terminal must exist in Extranet **Creation will allow**: Reception of Bills of Lading for the Voyage
2) Bills of Lading for the Voyage	Shipping Line	Electronic transaction (EDI , FTPS, or HTTPS) Transaction: **Bill of Lading**	As soon as the information is available to the Shipping Line (should be at the same time as the Voyage Description)	Shipping Line identifier Vessel ID Voyage number Bill of Lading number Freight Forwarder ID (Freight Forwarder responsible at Port of Montreal) ***For each Container on the Bill of Lading*** Container number Length Length unit of measure Type Load/Empty Weight Weight unit of measure Content Dangerous class Dangerous UN code Place of delivery Custom location Initial Trucking Company ID	**Required:** - Related Voyage description - Freight Forwarder must exist in Extranet **Creation will allow**: - Assignment of Trucking Company by Freight Forwarder - Status and release report by Terminal
3) Assign Containers to Trucking Company	Freight Forwarder	Electronic transaction or using Extranet screens Transaction: **Trucking Company Assignment** Screen: **16- Trucking**	As soon as the Freight Forwarder determines which Trucking Company will handle the Container	Freight Forwarder identifier Vessel ID Voyage number Bill of Lading number Container number Trucking Company name Pick-up date	**Required:** - Related Voyage description and Bill of Lading - Trucking Company must exist in Extranet. **Creation will allow**: Assignment of Truck Driver by Trucking

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
		Company Assignments		Instruction memo	Company
4) Each Release or Status change for a container.	Terminal	Electronic transaction or using Extranet screens Transaction: **Container Status Change** Screen: **5- Container Detail**	As soon as an event occurs on a Container	Terminal identifier Vessel ID Voyage number Container number + 1 or several events: *Event code* *Notes for event*	**Required:** Related Voyage description and Bill of Lading
5) Truck Driver Assignment	Trucking Company	Electronic transaction or using Extranet screens Transaction: **Truck Driver Assignment** Screen: **15- Truck Driver Assignment Detail**	As soon as the Dispatcher knows which Truck Driver will handle the Container	Trucking Company identifier Vessel ID Voyage number Container number Driver employee number Truck Number Date to complete transport Comment memo	**Required:** - Related Voyage description and Bill of Lading - Trucking Company must be assigned to Container. - Truck Driver must exist in Extranet

Table 10 Data Information for Import Voyage

3.16.2 Data Information for Export Voyage

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
1) Voyage Description	Shipping Line	Electronic transaction (EDI , FTPS, or HTTPS) Transaction: **Voyage Description**	As soon as the information is available to the Shipping Line	Shipping Line identifier Vessel ID Voyage number Port name (Montreal) Terminal name Export indicator Departure date Departure time Berth at Terminal Total number of Containers handled in Montreal	**Required:** Shipping Line, Port, and Terminal must exist in Extranet **Creation will allow**: Reception of Bills of Lading for the Voyage
2) Create Booking for Trucking Company (same booking # may be used several times)	Freight Forwarder	Electronic transaction or using Extranet screens.\ Transaction: **Manage Empty Memo** Screen: **6- Manage Empty Memo**	Each time a booking is assigned to a Trucking Company	Freight Forwarder identifier Vessel ID Voyage number Booking number Trucking Company name Booking date Number of Containers Instruction memo	**Required:** - Related Voyage description - Trucking Company must exist in Extranet.
3) All Bills of Lading for the Voyage	Shipping Line	Electronic transaction (EDI , FTPS, or HTTPS) Transaction:	As soon as the information available to the Shipping Line (should be at the same time as the	Shipping Line identifier Vessel ID Voyage number Bill of Lading	**Required:** - Related Voyage description - Freight Forwarder must

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
		Bill of Lading	Voyage Description	number Freight Forwarder ID (Freight Forwarder responsible at Port of Montreal) ***For each Container on the Bill of Lading*** Container number Length Length unit of measure Type Load/Empty Weight Weight unit of measure Content Dangerous class Dangerous UN code Place of delivery Custom location Initial Trucking Company ID	exist in Extranet **Creation will allow**: - Assignment of Trucking Company by Freight Forwarder - Status and releases report by Terminal
4) Assign Containers to Trucking Company	Freight Forwarder	Electronic transaction or using Extranet screens Transaction: **Trucking Company Assignment** Screen: **16- Trucking Company Assignment**	As soon as the Freight Forwarder determines which Trucking Company will handle the Container	Freight Forwarder identifier Vessel ID Voyage number Bill of Lading number Container number Trucking Company name Pick-up date Instruction memo	**Required:** - Related Voyage description and Bill of Lading - Trucking Company must exist in Extranet **Creation will allow**: Assignment of Truck Driver by Trucking Company
5) Release or Status change for a Container	Terminal	Electronic transaction or using Extranet screens Transaction: **Container Status Change** Screen: **5- Container Detail**	As soon as an event occurs on a Container	Terminal identifier Vessel ID Voyage number Container number + 1 or several events: *Event code* *Notes for event*	**Required:** Related Voyage description and Bill of Lading

Table 11 Data Information for Export Voyage

3.16.3 General Data Information

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
1) Truck Driver Information	Trucking Company	Using Extranet screen Screen: **7- Manage Drivers**	When Truck Driver has been hired, fired, laid off, or has quit, or when Truck Driver's information changes	Trucking Company identifier Truck Driver's name Employee Number Active/inactive flag Picture filename	**Creation will allow**: Assignment of Truck Driver by Trucking Company

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
2) Terminal Information	Terminal + Extranet Administrator	Form filled out by Terminal and sent to Extranet Administrator, who is responsible for applying changes to the Extranet	When Terminal subscribes to Extranet community or when its information changes	Terminal ID Terminal name Terminal address Terminal gen. phone Terminal Web site 1st e-mail for alert Language code for 1st e-mail 2nd e-mail for alert Language code for 2nd e-mail 1 to 3 contacts: Contact name Title Telephone Fax E-mail City	**Creation will allow**: - Voyage Description creation related to that Terminal - That Terminal to be able to send Container's status and releases
3) Shipping Line Information	Shipping Line + Extranet Administrator	Form filled out by Shipping Line and sent to Extranet Administrator, who is responsible for applying changes to the Extranet	When Shipping Line subscribes to the Extranet community or when its information changes	Shipping Line ID Shipping Line name Shipping Line address Shipping Line gen. phone Shipping Line Web site 1 to 3 contacts: Contact name Title Telephone Fax E-mail City	**Creation will allow**: Shipping Lines to be able to send Voyage Description and Bill of Lading
4) Freight Forwarder Information	Freight Forwarder + Extranet Administrator	Form filled out by Freight Forwarder and sent to Extranet Administrator, who is responsible for applying changes to the Extranet	When Freight Forwarder subscribes to Extranet community or when its information changes	Freight Forwarder ID Freight Forwarder name Freight Forwarder address Freight Forwarder gen. phone Freight Forwarder Web site 1st e-mail for alert Language code for 1st e-mail 2nd e-mail for alert Language code for 2nd e-mail 1 to 3 contacts: Contact name Title Telephone Fax E-mail City	**Creation will allow**: - Bill of Lading creation related to that Freight Forwarder - That Freight Forwarder to be able to send Trucking Company assignment to Containers
5) Trucking Company Information	Trucking Company + Extranet Administrator	Form filled out by Trucking Company and sent to Extranet Administrator, who is responsible for applying changes to	When Trucking Company subscribes to Extranet community or when its information changes	Trucking Company ID Trucking Company name Trucking Company address	**Creation will allow**: - Trucking Company assignment related to that Trucking Company - That Trucking Company to be able to send Truck

Information	Who supplies information	How to supply information	When to supply information	Minimum data elements required	Conditions
		the Extranet		Trucking Company gen. phone Trucking Company Web site 1st e-mail for alert Language code for 1st e-mail 2nd e-mail for alert Language code for 2nd e-mail 1 to 3 contacts: Contact name Title Telephone Fax E-mail City	Driver assignment to Containers

Table 12 General Data Information

3.17 Document Reception

In this report, six different transactions (or documents) have been identified:

1. Voyage Description
2. Bill of Lading
3. Trucking Company Assignment
4. Manage Empty Memo
5. Container Status Change
6. Truck Driver Assignment

The format for the transactions defined in sections 3.3 through 3.8 is not necessarily the format that the stakeholder will use to send the transactions. An important objective for the Extranet design is to be flexible, which in this case means accepting different methods of transmission and transaction formats to accommodate stakeholders that wish to become members of the Extranet.

It is not possible to describe the exact transaction format for each stakeholder because formats will vary for every stakeholder that becomes a member of the Extranet. The important thing is that each element described in the general transaction format (see sections 3.3 to 3.8) must be included in a specific stakeholder's transaction format.

In the implementation phase, it will be necessary to design the exact format of the required transaction, as well as the method of transmission for each stakeholder participating in the Extranet.

As identified in the GEIS analysis, a document translation process is required to accept documents from different sources and in different formats. This will allow the Extranet to connect to existing sources of information that may not have data available in the format expected by the Extranet. The Extranet's standard format to receive transactions is XML based. The system also accommodates any structured ASCII format (e.g., EDI). This is done through a document translation process that converts incoming transactions to the XML document standard.

Several software vendors provide document translators. Two of the most popular document translators on the market are Mercator and Biztalk (Microsoft). In the current design, Biztalk has been selected as the preferred translator.

The Extranet translator will be responsible for:

1. Receiving transactions from various stakeholders;
2. Transforming these transactions into a format recognized by the Extranet application;
3. Sending newly formatted transactions to the Extranet application, and waiting for response and acknowledgement;
4. Transforming the acknowledgement received from the Extranet into a format recognized by the stakeholder that sent the original transaction;
5. Sending the acknowledgement to the stakeholder.

3.17.1 Document Transmission Methods

The Extranet supports three protocols for document transmission:

1. HTTPS
2. FTPS
3. EDI

Although FTP can be supported for the Extranet, it is recommended that **HTTPS be the preferred method** offered to Extranet stakeholders. HTTPS provides the same point-to-point file transfer mechanism, and it is a simpler and better implementation because it is an on-line process (a screen allows the user to specify a file to upload). It may also be automated.

HTTPS document transmission method

An ASP receive function is implemented by creating an ASP page on which partners will use HTTPS to post business data. The HTML form will accept the following parameters: User ID, Password, and Upload file. In the ASP script, the user ID and password are validated and the received HTML form is submitted to the Document Translator Server by calling the server's COM interface. The document is saved on the Extranet, where the translator will search regularly for documents to process. An acknowledgement is returned in the HTTPS response. The user is immediately informed if the transaction has been received successfully.

The HTTPS transmission method is preferred as it provides user authentication (user ID and password are sent in the HTTP request) and data encryption through the use of the SSL mechanism.

This method provides the same security mechanism as accessing the system through a browser.

HTTPS send program:

To facilitate and promote the HTTPS transmission method, the provider should create and distribute to the stakeholders (Terminals, Shipping Lines, etc.) a program that handles the HTTPS send protocol. The program would be a simple executable program whose parameters include a user ID, a password, and a filename to send to the Extranet. For example, the HTTPS send program could be invoked from the MSDOS command line as follows:

```
Send_https Terminal_user password Container_status.xml
```

The Send_https program would be a program that the different stakeholders could download from a web page (once they had successfully logged on to the Extranet).

FTPS document transmission method (FTP Secure)

An FTP Server will be installed to receive transactions. Since the standard implementation of FTP has serious security flaws, implementing FTPS (FTP Secure) is recommended as it provides secured user authentication and data encryption over the public Internet.

Each user able to send files through the batch interface will have a unique FTP user ID and password assigned when registering to use the Extranet. The user will have Inbox and Outbox folders. The Outbox folder is used to deposit documents to be processed by the system. The Inbox folder is used to receive documents from the Extranet such as the document Acknowledgement.

Unlike the HTTPS transmission method, this is a batch process in which the transaction is not processed on-line. The application must read the Inbox directory to find the file processing status.

This FTP Transmission method is similar to what is commonly used by VAN services such as any EDI server.

VAN document transmission method

Transaction files can also be received from a VAN. In order to support a VAN interface, the Extranet will need to open a VAN account with an EDI supplier.

Typically, a VAN access requires the customer to use a dial-up account with a mailbox and does not use the Internet as the network. To support VAN access, a separate PC will be set up to become the Gateway to the VAN account. This PC would periodically (e.g., every hour) logon to the VAN mailbox (dial out) and perform a send and receive.

Most VAN providers distribute a program to automate the connection to the customer's mailbox.

The VAN Gateway (a PC from the Port of Montreal Extranet) would be configured with Inbox and Outbox file folders. The Inbox file folder would receive files from the VAN, the Outbox file folder would contain files to send to the VAN.

The Document Translator server will be configured to process files from the VAN PC Gateway Inbox folder and to deposit files to a VAN user via the VAN Gateway Outbox folder.

Modules to be implemented

In addition to a standard FTPS server and a VAN server, the following functions need to be implemented for the Extranet Document Processing Interface:

- HTTPS Upload screen;
- HTTPS Send module;
- VAN Gateway module;
- Document Translator module.

These functions are described in sections 3.17.2 to 3.17.5.

3.17.2 HTTPS Upload Screen (NETGATE)

FR-17-2	**Functional Requirement Name:** HTTPS Upload Screen (NETGATE)
Functional Focus:	**Priority:** High

Functional Requirement Definition: Allows a stakeholder to upload information to the Extranet database.

INTRODUCTION:
The HTTPS Upload Screen is an HTML page accessible from the Internet (https://www.portmtl.com/netgate.asp) that allows different stakeholders to send document files to the Port of Montreal Extranet for processing. This HTML page contains a user ID, user password, and file to upload field as presented below.

INPUT:
The user keys in the information in the upload screen. The file containing the information to be uploaded must be ready.

PROCESSING:
This page performs the following actions on the Web Server:

- Validates user ID and password;
- Receives the upload file;
- Submits the upload file to the translator server;
- Waits for processing status from the translator server;
- Returns processing response to the user (Success/Failure).

This page is accessible to different users for manual file upload as well as the net_upload program (see section 3.17.3), which uploads files to the Port of Montreal Extranet without user intervention.

OUTPUT:

- The Extranet database is updated with stakeholder information;
- An acknowledgement is sent to the user.

Function 18 HTTPS Upload Screen

3.17.3 HTTPS Send Module (Net_upload)

FR-17-3	**Functional Requirement Name:** HTTPS Send Module (Net_upload)	
Functional Focus:		**Priority:** High

Functional Requirement Definition: Handles HTTPS send protocol without user intervention.

INTRODUCTION:
To facilitate and promote the HTTPS transmission method, the provider will create and distribute to the stakeholders (Terminals, Shipping Lines, etc.) a program that handles the HTTPS send protocol.

The Net_upload module is used to send documents to the Extranet. Documents can be in an XML format or any other format supported by the Extranet (X.12 EDI, proprietary format, etc.). Once the document is sent, it is submitted to the document translator module, which translates the document to the XML document format standard recognized by the Extranet. For each document that does not use the native XML standard format, a map will have to be developed using the document map editor (Biztalk).

INPUT:
The module (Net_upload) must be launched by a scheduler or by a command typed by a user. The file containing the information to be uploaded must be ready.

PROCESSING:
The Net_upload program is a simple MS-Windows executable program whose parameters include a user ID, a password, and the name of the file to send to the Extranet. For example, the Net_upload program could be accessed with the MSDOS command line as follows:

```
Net_upload Terminal_user password Container_status.xml
```

The net_upload module performs the following steps:

- Initiate an HTTPS connection to a specific Web server URL (e.g., https://www.portmtl.com/netgate.asp);
- Format an HTTPS POST request containing the following information:
    - Program Version Number (to control software versions)
    - User ID
    - Password
    - Filename to send;
- Wait for response from the server and display it to the user;
- Terminate with a specific termination code (e.g., a termination code of 0 is used for successful completion. Another termination code indicates a processing error);
- Log execution time and status to a Log file.

OUTPUT:

- The net_upload program reports errors to the user. Typical errors include:
    - URL not found;
    - Connection timed out;
    - User ID or password invalid;
    - Input File not found;
    - Unknown document format;
    - Server not available.
- The Extranet database is updated with stakeholder information.
-

Function 19 HTTPS Send Module (Net_upload)

3.17.4 VAN Gateway Module (VANGATE)

FR-17-4	**Functional Requirement Name:** VAN Gateway Module (VANGATE)	
Functional Focus:		**Priority:** High

Functional Requirement Definition: Verifies the reception of an EDI document and transfers it to the document translator.

INTRODUCTION:
The VAN Gateway allows the reception of documents transmitted from stakeholders that use traditional VAN services. This VAN transmission method is used primarily by users that are already using VAN services and do not want to implement the HTTPS document transmission method.

The Port of Montreal will set up a VAN mailbox with a VAN provider to receive documents.

The VAN Gateway Module will periodically connect to the mailbox, retrieve documents from it, and deposit the incoming documents as files to specific folder on disk (Inbox folder). The incoming documents will then be submitted to the document translator server for document processing.

INPUT:

- Documents received through EDI (one of the six transactions defined);
- Documents ready to send through EDI (acknowledgements).

PROCESSING:
The VAN Gateway Module processing can be summarized as follows for incoming documents:

- Periodically connects to the VAN mailbox through a modem dial-up connection (e.g., every hour);
- Logs on to the mailbox with a specific user ID and password;
- Retrieves documents from the mailbox and saves documents to the Inbox folder. The Document Translator server monitors the Inbox folder and, as soon as a document is saved in the Inbox folder, the Document Translator server processes it;
- Alerts the operating console in case of error;
- Logs its actions in an activity log that can be read by an operator.

The VAN Gateway Module processing can be summarized as follows for outgoing documents (i.e., Acknowledgements):

- Verifies if there are documents to be sent, which are located in a specific Outbox folder;
- When there are documents to send, sends them to the VAN mailbox through a modem dial-up connection;
- Logs on to the mailbox with a specific user ID and password;
- Submits documents to the VAN and removes them from the Outbox folder once they have been successfully submitted;
- Alerts the operating console in case of error;
- Logs its actions in an activity log that can be read by an operator.

OUTPUT:

- Documents are ready for the Translator to process;
- Documents are ready to process by EDI.

Function 20 VAN Gateway Module (VANGATE)

3.17.5 Document Translator Module (TRANSLATOR)

FR-17-5	**Functional Requirement Name:** Document Translator Module (TRANSLATOR)
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives documents from one of the allowed transmission methods (FTP, HTTPS, or VAN gateway), translates these documents into the correct format, and sends them to the Extranet application.

INTRODUCTION:
The Document Translator Module allows the different Extranet stakeholders to submit their data files (documents) in a format other than the standard XML format defined for the Extranet.

The Document Translator Server provides extensive document logging and monitoring tools that facilitate the tracking and operations of the system.

The module to be implemented will be software that already exists on the market. Biztalk from Microsoft is currently the best choice.

INPUT:
Documents received from one of the gateways (VAN, FTPS, or HTTPS).

PROCESSING:
The Translator validates the incoming document and converts it to the XML standard format. Each document conversion requires the creation of a map using the Biztalk document translator editor. Development and implementation of a new map is estimated to take approximately six days, depending on the complexity of the document to translate.

OUTPUT:
Documents are sent to the Extranet application in the internal format (XML).

Function 21 Document Translator Module (TRANSLATOR)

3.18 Screens Flow

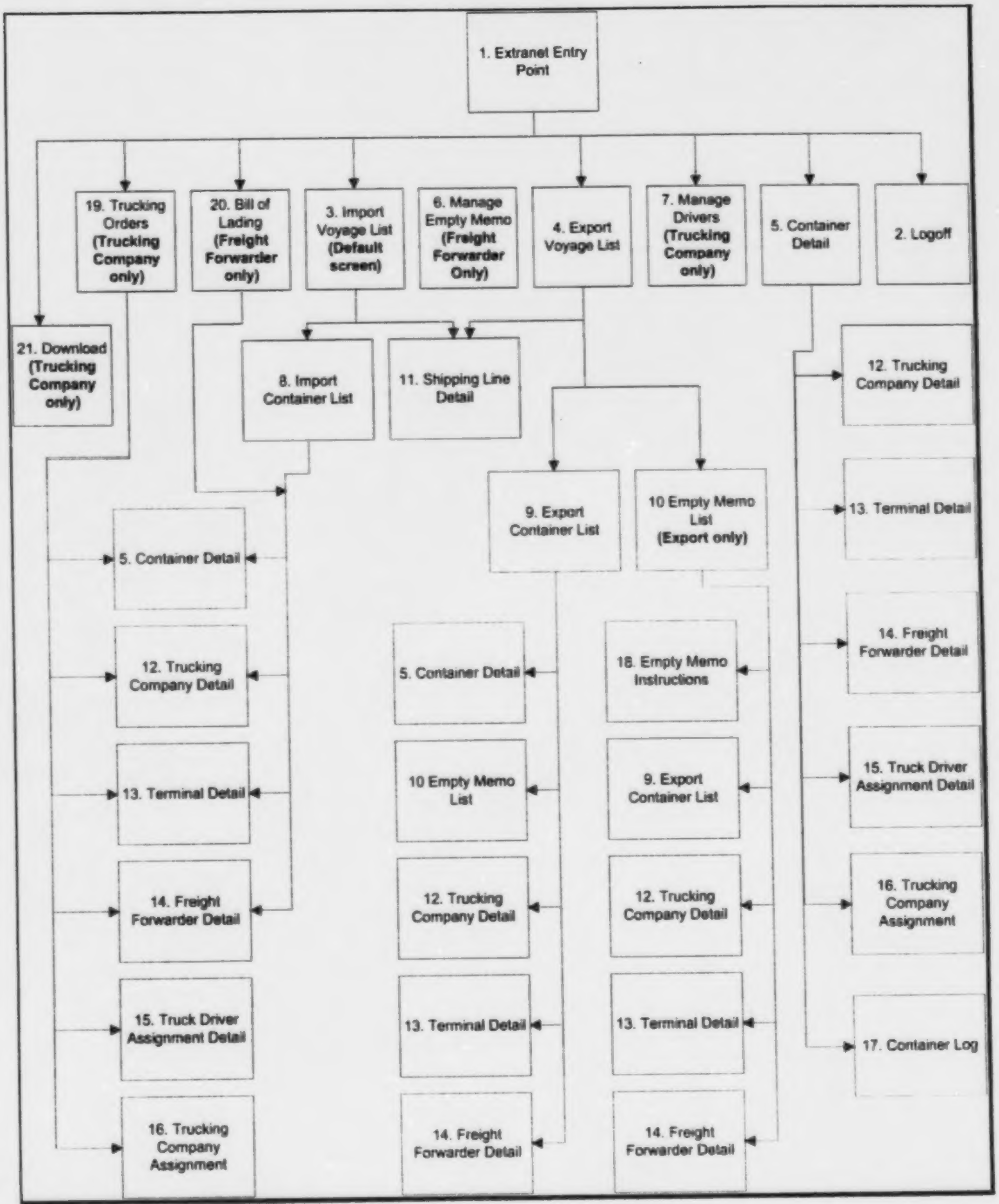

1. Extranet Entry Point
19. Trucking Orders (Trucking Company only)
20. Bill of Lading (Freight Forwarder only)
3. Import Voyage List (Default screen)
6. Manage Empty Memo (Freight Forwarder Only)
4. Export Voyage List
7. Manage Drivers (Trucking Company only)
5. Container Detail
2. Logoff
21. Download (Trucking Company only)
8. Import Container List
11. Shipping Line Detail
12. Trucking Company Detail
9. Export Container List
10 Empty Memo List (Export only)
13. Terminal Detail
5. Container Detail
14. Freight Forwarder Detail
18. Empty Memo Instructions
10 Empty Memo List
15. Truck Driver Assignment Detail
16. Trucking Company Assignment
17. Container Log

Figure 5 Screens Flow

3.19 Screens Description

The purpose and functionality of each screen are described in this section. Criteria used for searching in the database are also stated. These criteria may vary depending on the context, the type of user logged on, or the way in which the screen was accessed.

In the screen definition, no specifications are made for government agency users. These users will have the right to see all the information in the Extranet with no restrictions, but will not be able to modify information in the Extranet.

Each screen description is accompanied by a picture representing the desired look for the Extranet screen. This design may change at implementation

3.19.1 Screen: Extranet Entry Point

Diagram reference number: 1

Context: This is the first screen seen by anyone trying to access the Port of Montreal Extranet.

Purpose: This screen is the entry point of the Extranet. It will be displayed when a user keys in the official address of the Extranet (e.g., www.portmtl.com). Two kinds of users may access the screen:

1. Stakeholder that is already a member of the Extranet;
2. User requiring information about the Extranet.

From this screen, two hyperlinks are available to neet the needs of these two kinds of users.

The first hyperlink accesses the application. When a user clicks on this link, Windows security will start its own built-in features to handle the Logon. If the Logon is successful, the first screen of the application will be displayed (Import Voyage List). For more information on security, see section 5.

The other hyperlink does not require authentication and allows anonymous users to have access to general information. For more information, see section 3.15.

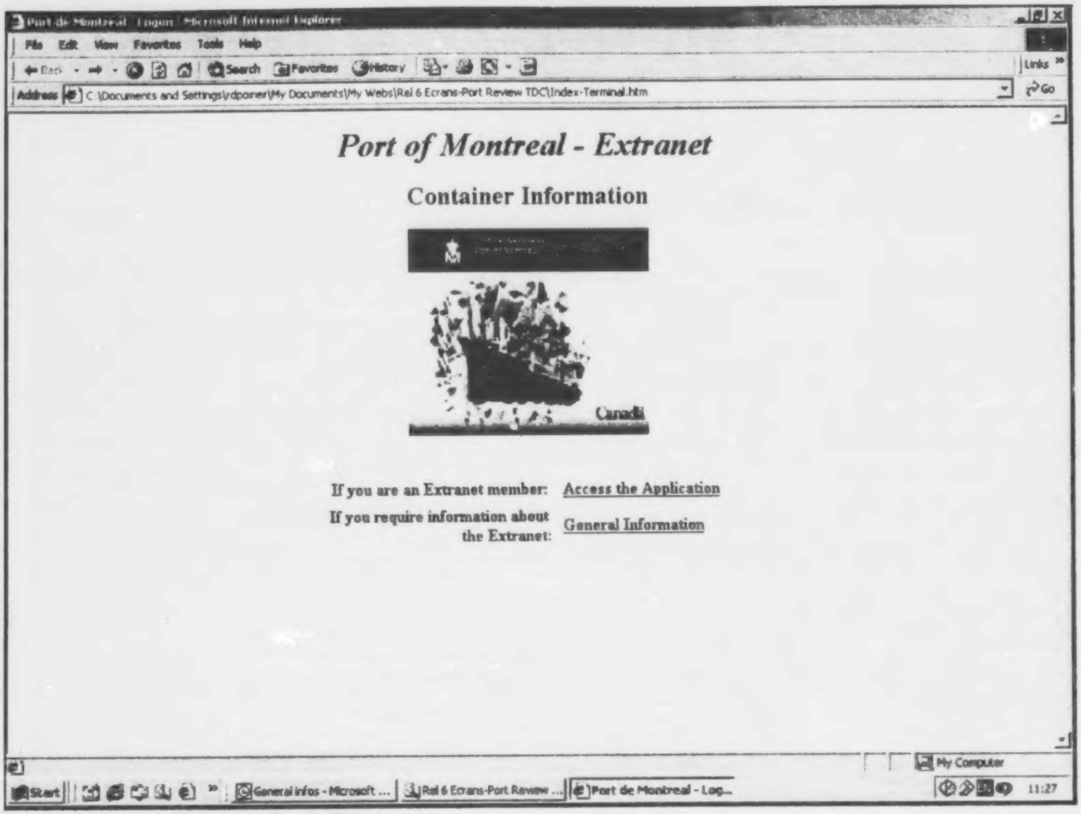
Fields: None

Hyperlink:

- **Access the Application:** Link to the Extranet application, Windows will intercept the request to start the security mechanisms for the authentication;
- **General Information:** Link to general information on the Extranet available to anybody.

Database updates: None.

Log updates: NT, Web, and SQL log will be written.


Port de Montreal - Logon - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\dpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\Index-Terminal.htm
Go
Canada
My Computer
Start
General infos - Microsoft ...
Rel 6 Ecrans-Port Review ...
Port de Montreal - Log...
11:27

Port of Montreal - Extranet

Container Information

If you are an Extranet member: Access the Application

If you require information about the Extranet: General Information

Figure 6 Extranet Entry Point

3.19.2 Screen: Logoff

Diagram reference number: 2

This confirmation screen asks whether the user really wants to logoff and quit the Extranet application for the Port the Montreal.

For any kind of user, this screen is displayed after clicking on the Logoff option on the side menu.

If the user answers "No" to the question "Are you sure you want to Logoff?", the system takes the user back to the last screen before the option "Logoff" was selected.

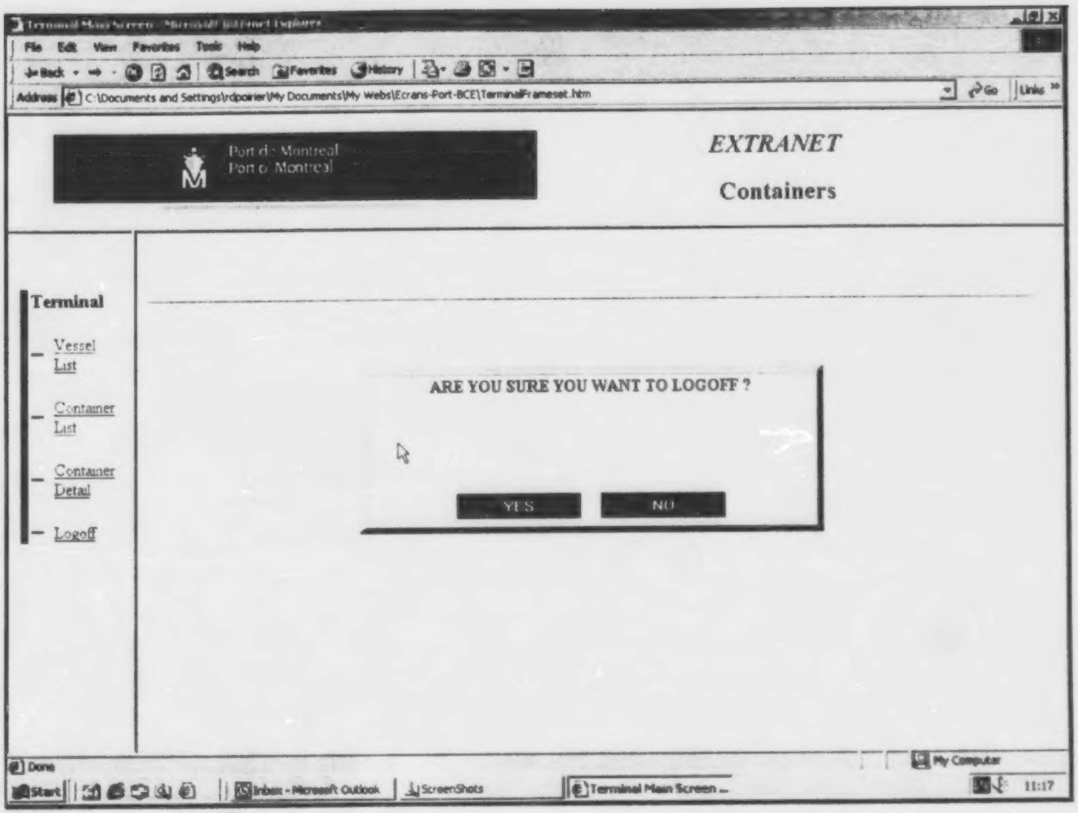
If the user answers "Yes" to the question "Are you sure you want to Log off?", the system clears all current context, the user is logged off, and the Extranet Entry Point screen is displayed.

Note: The Logoff screen will be a pop-up window displayed over the current screen of the user.

Fields: None

Buttons:

- **Yes:** Leaves the system and displays the Extranet Entry Point screen;
- **No:** The user is taken back to the screen where Logoff was selected. That screen is refreshed if any information has changed.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address
Go Links
Port de Montreal
Port of Montreal
Terminal
Vessel List
Container List
Container Detail
Logoff
YES
NO
Done
My Computer
Start
Inbox - Microsoft Outlook
ScreenShots
Terminal Main Screen ...
11:17

C:\Documents and Settings\rdpoirier\My Documents\My Webs\Ecrans-Port-BCE\TerminalFrameset.htm

EXTRANET

Containers

ARE YOU SURE YOU WANT TO LOGOFF ?

Figure 7 Logoff

3.19.3 Screen: Import Voyage List

Diagram reference number: 3

All Voyages identified as **import** are listed on this screen. A filter that specifies a range of Voyage arrival dates is applied to shorten the list and make it more manageable. The user may modify the range and refresh the screen. Default values are one day in the past and six days in the future, resulting in a Voyage list of one week.

The user may also change the sorting criterion for the list displayed. By default, the list is sorted by Estimated Date of Arrival. The user may change this criterion to either Shipping Line or Vessel name.

The default values (range of dates and sorting criteria) are defined as parameters that can be changed by stakeholders.

General information related to each Voyage is displayed on the list: Vessel Name, Voyage Number, Berth where ship will arrive, Shipping Line responsible for the Voyage, Estimated Date of Arrival, and Number of Containers.

With this screen, it is possible to select one or more import Voyages and display an Import Container List for the Voyages selected.

All users are able to see a list of all Voyages planned to arrive at the Port of Montreal. Some Voyages may be selected from this list and others may not. To see more detailed information such as a list of Containers for a specific Voyage, the user logged on must be a stakeholder related to that particular Voyage and Container, otherwise the Voyage cannot be selected.

Conditions to display Import Container List:

- For Terminal users: the Terminal related to the Voyage in the database must be the same as the one logged on;
- For Shipping Line users: the Shipping Line related to the Voyage in the database must be the same as the one logged on;
- For Freight Forwarder users: the Voyage must contain at least one Bill of Lading for which the related Freight Forwarder is the same as the one logged on;
- For Trucking Company users: the Voyage must contain at least one Order assigned to the same Trucking Company as the one logged on.

Contexts:

- First screen displayed (default screen) after a successful logon by a user (no context received);
- Reached by the side menu option (no context received);
- Displayed after changing the Screen Selection and clicking on the Refresh button.

Date selection (Filter):

- Arrival Date range fields may be changed and the screens refreshed by the user to list older or more recent Voyages;
- Default values are defined as parameters for the range. These values can be changed (e.g., one day in the past and six days in the future).

Search criteria to create the list: same criteria for all users and contexts.

- Selects all Voyages identified as import with an arrival date included in the range of Arrival Dates of the screen selection.

Database elements used for the search:

- Field vyge_impexp_cd in Voyage table for import indication;
- Field vyge_expctd_dttm for Expected Date of Arrival. If the ship has arrived, the value may represent an actual date. The field is in the Voyage table.

Special situation: The number of Containers per Voyage displayed on the list will not be the same depending on the type of user logged on.

- Shipping Line, Terminal, and Government: total number of Containers on the ship handled at the Port of Montreal;
- Freight Forwarder: number of Containers included on the Bills of Lading related to the Freight Forwarder logged on;
- Trucking Company: number of Containers assigned to the Trucking Company logged on.

Note: Upon implementation of the Extranet, it is possible that the SQL required for special situations concerning the number of Containers will be time consuming. If so, the scope of that field will be restricted.

Contexts for other screens:

- Voyages can be selected from this screen. A context is created and may be given to the Import Container List screen. The context is a list of Voyage numbers.

Selection Criteria: The user may select two criteria to generate a more accurate list:

- **Sort:** The user may select from three sorting criteria (ETA, Vessel Name, or Shipping Line). The default selection is ETA;
- **Arrival Date Range:** The user may modify the range of arrival dates for the Voyage displayed. The default entry is one day in the past and six days in the future;
- **Refresh button:** The user clicks on this button to refresh the list after changing the criteria.

Fields (display only):

- **Related to *user's company*:** name of the user's company is displayed (CAST in Figure 8);
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Berth:** Berth number where the ship will arrive;
- **Shipping Line:** name of the Shipping Line responsible for the Voyage;
- **ETA:** estimated date of arrival of the vessel for that specific Voyage. Once the ship has arrived, the value may represent an actual time;
- **Number of Containers:** number of Containers related to the user logged on for that specific Voyage (see special situation).

Hyperlink:

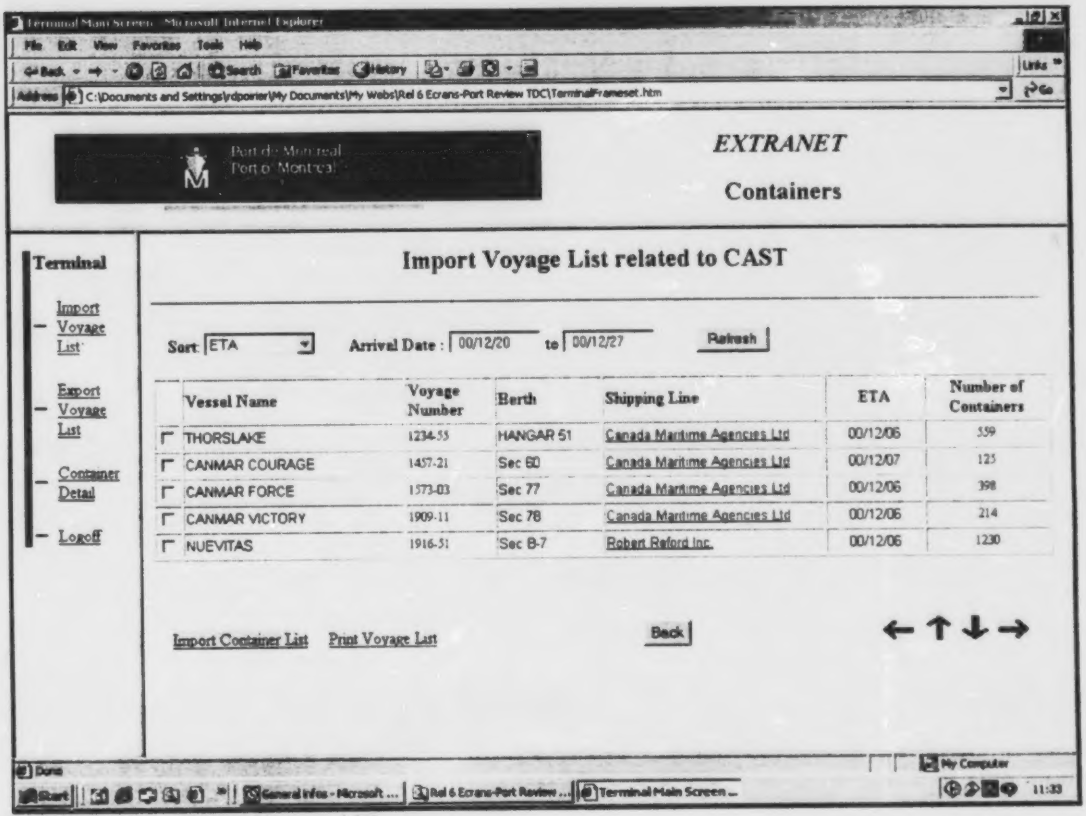
- **Shipping Line Field:** link to the Shipping Line Detail screen.

Buttons:

- **Import Container List:** launches the Import Container List screen for a selected Voyage (using check box at left of each line). If no selection is made, the Container list will be empty;
- **Print Voyage List:** prints a formatted list of the current Voyage list with fields included on the screen;
- **Back:** takes the user back to the previous screen;

- **Four arrows:** allow the user to navigate within the Voyage list, should the list take up more room than the screen can display;
- **Refresh:** updates screen's information.

Database updates: N/A.



EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Import Container List
Print Voyage List
Back
← ↑ ↓ →

Import Voyage List related to CAST

Sort: ETA

Arrival Date : 00/12/20 to 00/12/27

Refresh

	Vessel Name	Voyage Number	Berth	Shipping Line	ETA	Number of Containers
☐	THORSLAKE	1234-55	HANGAR 51	Canada Maritime Agencies Ltd	00/12/06	559
☐	CANMAR COURAGE	1457-21	Sec 60	Canada Maritime Agencies Ltd	00/12/07	125
☐	CANMAR FORCE	1573-03	Sec 77	Canada Maritime Agencies Ltd	00/12/06	398
☐	CANMAR VICTORY	1909-11	Sec 78	Canada Maritime Agencies Ltd	00/12/06	214
☐	NUEVITAS	1916-51	Sec B-7	Robert Reford Inc.	00/12/06	1230

Figure 8 Import Voyage List

3.19.4 Screen: Export Voyage List

Diagram reference number: 4

All Voyages identified as **export** are listed on this screen A filter that specifies a range of Voyage departure dates is applied to shorten the list and make it more manageable. The user may modify the range and refresh the screen. Default values are one day in the past and six days in the future, resulting in a Voyage list of one week.

The user may also change the sorting criterion for the list displayed. By default, the list is sorted by Estimated Date of Departure. The user may change this criterion to either Shipping Line or Vessel name.

The default values (range of dates and sorting criteria) are defined as parameters that can be changed by stakeholders.

General information related to each Voyage is displayed on the list: Vessel Name, Voyage Number, Berth from which the ship will depart, Shipping Line responsible for the Voyage, Estimated Date of Departure, and Number of Containers.

With this screen, it is possible to select one or more export Voyages and display an Export Container List or an Empty Memo List for the Voyages selected.

All users are able to see a list of all Voyages planned to depart from the Port of Montreal. Some Voyages may be selected from this list and others may not. To see more detailed information, such as a list of Containers for a specific Voyage, the user logged on must be a stakeholder related to that particular Voyage and Container, otherwise the Voyage cannot be selected.

Conditions to select a Voyage:

- For Terminal users: the Terminal related to the Voyage in the database must be the same as the one logged on;
- For Shipping Line users: the Shipping Line related to the Voyage in the database must be the same as the one logged on;
- For Freight Forwarder users: the Voyage must contain at least one Bill of Lading for which the related Freight Forwarder is the same as the one logged on;
- For Trucking Company users: the Voyage must contain at least one Order assigned to the same Trucking Company as the one logged on.

Contexts:

- Reached by the side menu option (no context received).
- Displayed after changing the Screen Selection and clicking on the Refresh button.

Range selection (Filter):

- Departure Date range fields may be changed and the screens refreshed by the user to list older or more recent Voyages;
- Default values are defined as parameters for the range. These values can be changed (e.g., one day in the past and six days in the future).

Search criteria to create the list: same criteria for all users and contexts.

- Selects all Voyages identified as export with a departure date included in the range of Departure Dates of the screen selection.

Database elements used for the search:

- Field vyge_impexp_cd in Voyage table for export indication;
- Field vyge_expctd_dttm for Expected Date of Departure. If the ship has departed, the value may represent an actual date. The field is in the Voyage table.

Special situation: The number of Containers per Voyage displayed on the list will not be the same depending on the type of user logged on.

- Shipping Line, Terminal, and Government: total number of Containers on the ship handled at the Port of Montreal;
- Freight Forwarder: number of Containers included in the Bills of Lading related to the Freight Forwarder logged on;
- Trucking Company: number of Containers assigned to the Trucking Company logged on.

Note: Upon implementation of the Extranet, it is possible that the SQL required for special situations concerning the number of Containers will be time consuming. If so, the scope of that field will be restricted.

Contexts for other screens:

- Voyages can be selected from this screen. A context is created and may be given to the Export Container List or Empty Memo List screens. The context is a list of Voyage numbers.

Selection Criteria: The user may select two criteria to generate a more accurate list:

- **Sort:** The user may select from three sorting criteria (ETD, Vessel Name, or Shipping Line). The default selection is ETD;
- **Departure Date Range:** The user may modify the range of departure dates for the Voyage displayed. The default entry is one day in the past and six days in the future;
- **Refresh button:** The user clicks on this button to refresh the list after changing the criteria.

Fields (display only):

- **Related to *user's ompany*:** name of the user's company is displayed (CAST in Figure 9);
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Berth:** number of the Berth from which the ship will depart;
- **Shipping Line:** name of the Shipping Line responsible for the Voyage;
- **ETD:** Estimated Time of Departure of the vessel for that specific Voyage. Once the ship has departed, the value may represent an actual time;
- **Number of Containers:** number of Containers related to the user logged on for that specific Voyage (see special situation).

Hyperlink:

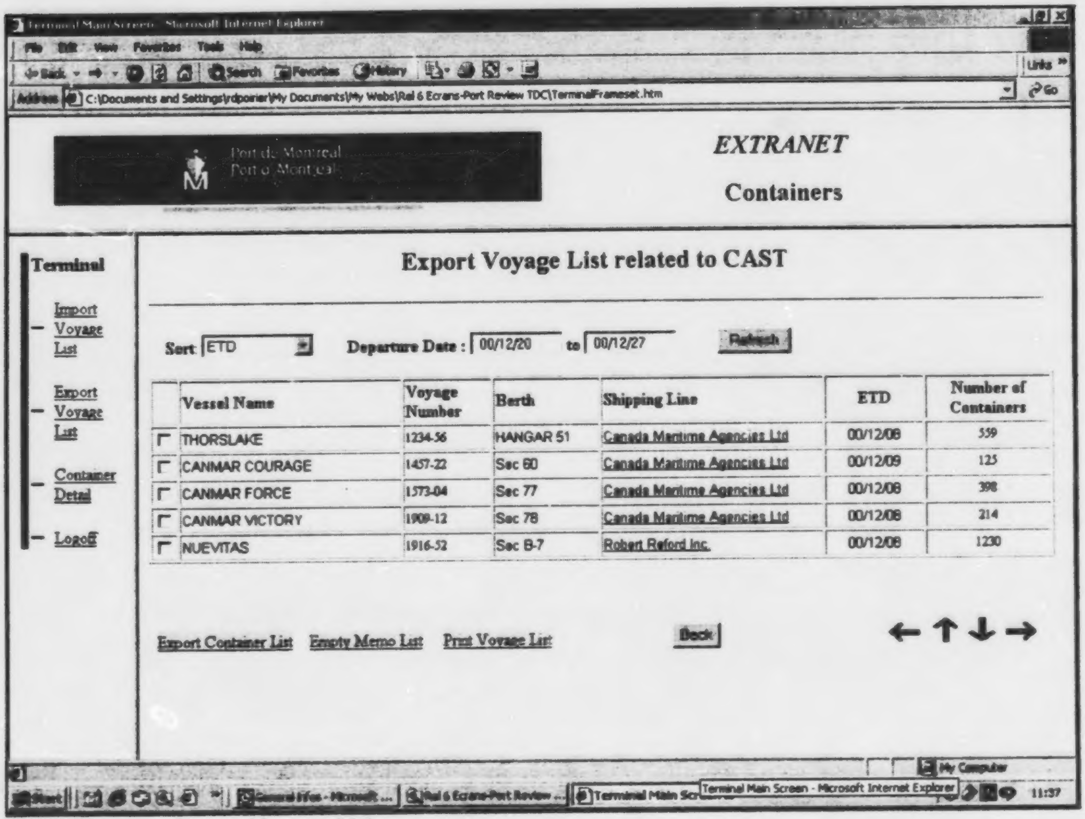
- **Shipping Line Field:** link to the Shipping Line Detail screen.

Buttons:

- **Export Container List:** launches the Export Container List screen for a selected Voyage (using check box at left of each line). If no selection is made, the Container list will be empty;
- **Empty Memo List:** launches the Empty Memo List screen for a selected Voyage (using check box at left of each line). If no selection is made, the Empty Memo list will be empty;

- **Print Voyage List:** prints a formatted list of the current Voyage list with fields included on the screen;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within the Voyage list, should the list take up more room than the screen can display
- **Refresh:** updates screen's information.

Database updates: N/A


File Edit View Favorites Tools Help
Back Search Favorites History
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Links
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
My Computer
Start
Terminal Main Screen - Microsoft Internet Explorer
11:37

Export Voyage List related to CAST

Sort: ETD

Departure Date : 00/12/20 to 00/12/27

Refresh

	Vessel Name	Voyage Number	Berth	Shipping Line	ETD	Number of Containers
☐	THORSLAKE	1234-56	HANGAR 51	Canada Maritime Agencies Ltd	00/12/08	559
☐	CANMAR COURAGE	1457-22	Sec 60	Canada Maritime Agencies Ltd	00/12/09	125
☐	CANMAR FORCE	1573-04	Sec 77	Canada Maritime Agencies Ltd	00/12/08	398
☐	CANMAR VICTORY	1909-12	Sec 78	Canada Maritime Agencies Ltd	00/12/08	214
☐	NUEVITAS	1916-52	Sec B-7	Robert Reford Inc.	00/12/08	1230

Export Container List Empty Memo List Print Voyage List Back ← ↑ ↓ →

Figure 9 Export Voyage List

3.19.5 Screen: Container Detail

Diagram reference number: 5

This screen displays information on a Container related to a specific Voyage. The same Container (identified by a Container number) may exist several times in the Extranet, but can only exist once for a specific Voyage in the Extranet.

The Container detail screen can be accessed in two different ways:

1. From a list selection on a previous screen: If the Container Detail screen is accessed from the Import Container List, Export Container List, Bill of Lading, or Trucking Order screen, it receives a context (i.e., the Voyage number and Container number). The screen displays information on a specifc Container for a specific Voyage.

The context may include one or more Containers. The user logged on must be authorized to see information on all Containers. If more than one Container is in the context, authorized users may navigate from one Container to another (within the list) using the arrow buttons.

2. From the side menu: Accessing the Container Detail screen this way, it receives no context at all and is displayed with no information. The user must key in a Container number and click on search to view its information. Any context existing before the search (i.e., from a previous search) is replaced by a new one containing the results of the search.

To perform a successful search, not only is the Container number needed, but the Container retrieved must be related to the user logged on:

- For Terminal users: the Container must be included in a Voyage related to the same Terminal as the one logged on;
- For Shipping Line users: the Container must be included in a Voyage related to the same Shipping Line as the one logged on;
- For Freight Forwarder users: the Container must be included on a Bill of Lading related to the same Freight Forwarder as the one logged on;
- For Trucking Company users: the Container must be assigned to the same Trucking Company as the one logged on.

Because a Container may exist several times in the Extranet (for different Voyages), the results of the search may include more than one Container. In this case, a list of Containers is displayed in a pop-up window to let the user choose a specific Container. The following information will help users to select the right Container from the list: Vessel Name, Voyage Date, Import/Export indicator, and related Terminal.

If no Container matching the Container number is retrieved, a detailed message is displayed.

Contexts:

- Reached from previous list selection (Import Container List, Export Container List, Bill of Lading, Trucking Order). A list of Container numbers with related Voyage numbers is received. The list may include zero, one, or several Containers. If there are no Containers on the list, the user may key in a Container number and perform a search;
- Launching a search on a Container number creates a new context with a list (Application action) of one Container.

Search criteria following a list selection:

- Selects the Container information from the Containers in the context list. Voyage and Container numbers are used to retrieve the correct Container.

Search criteria following Container number search:

- Selects Container information corresponding to the Container number keyed in;
- For Terminal users, the Voyage associated with the retrieved Container must be related to the same Terminal as the one logged on;
- For Freight Forwarder users, the Bill of Lading associated with the retrieved Container must be related to the same Freight Forwarder as the one logged on;
- For Trucking Company users, an Order (Trucking Company assignment) for the retrieved Container must exist for the same Trucking Company as the one logged on;
- For Shipping Line users, the Voyage associated with the retrieved Container must be related to the same Shipping Line as the one logged on;
- For Government users, only Container numbers used;
- If the search turns up more than one Container, a pop-up list is displayed for the user (with Vessel Name, Voyage Date, Import/Export indicator, and related Terminal) to select the desired Container.

Database elements used for the search:

- Field unit_init_id + unit_nbr_id in Unit Summary table for Container number.

Search Container: With the Container number, the user may search for information on a specific Container. If the Container exists and is related to the user logged on, the information is displayed:

- ***Container Number:*** field to key in a Container number;
- **Search button:** user clicks on this button to begin the search;
- **Message:** if the Container is not found, a detailed message is displayed.

Fields (display only):

- **Container Number:** number of the Container;
- **Bill of Lading:** number of the Bill of Lading related to the Container;
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container and responsible for assigning the Container to a Trucking Company that will handle it to or from the Port of Montreal. If the user logged on is a Freight Forwarder, the field is not displayed on the screen;
- **Trucking Company:** name of the Trucking Company responsible for handling the Container to or from the Port of Montreal. The name appears only if the Freight Forwarder has made the assignment. If the user logged on is a Trucking Company, the field is not displayed;
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. If the user logged on is a Terminal, the field is not displayed;
- **Truck Driver Assignment:** name of the Truck Driver assigned to the Container and responsible for moving the Container to or from the Port of Montreal. The name appears only if the Trucking Company has made the assignment;
- **Delivery / Pickup Date:** date on which the Driver must move the Container to (Delivery or export) or from the Port of Montreal (Pickup or import);
- **Storage Date:** date on which the storage of the Container will start to be billed to the Trucking Company. This is for import purposes only; the Trucking Company has a limited period of time to pick up the Container;

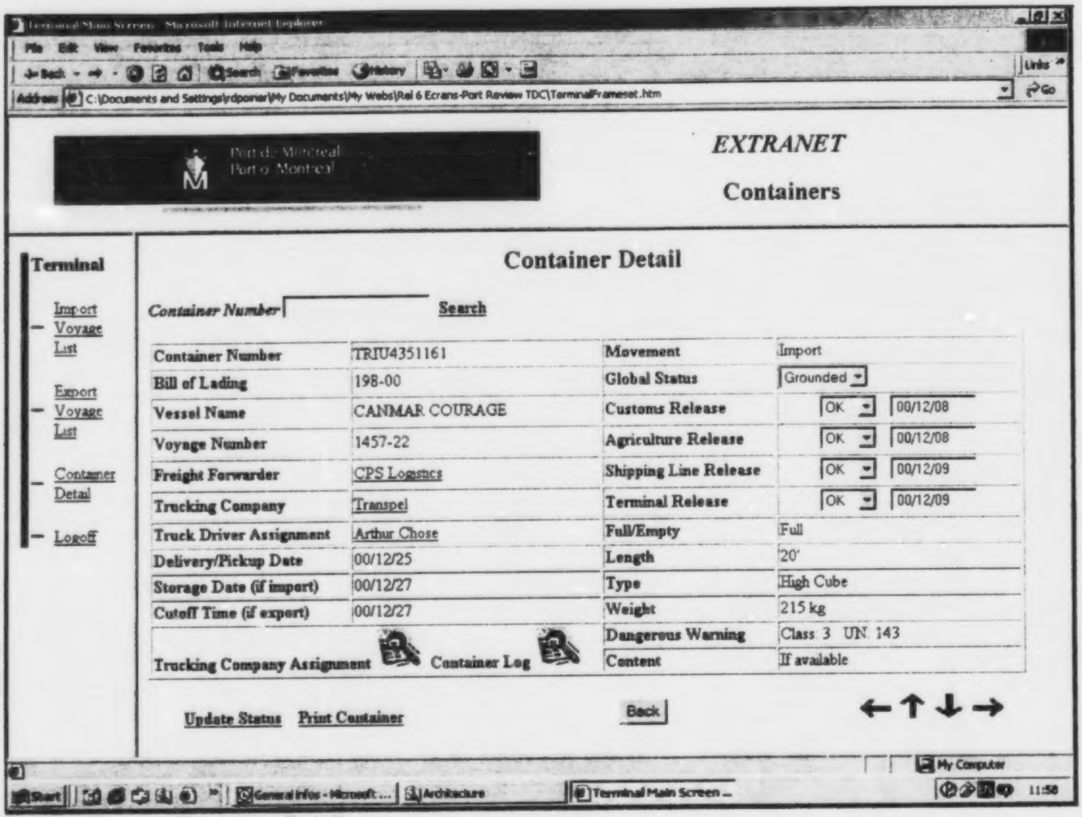
- **Cutoff Time:** date by which the Container must have arrived for a ship's departure. This is for export purposes only;
- **Movement:** type of movement of the Container (export or import);
- **Global Status:** the status of the Container can only be updated by the Terminal;
- **Custom Release:** release indicator for Customs, with a date if the release is completed. This can only be updated by the Terminal;
- **Agriculture Release:** release indicator for Agriculture, with a date if the release is completed. This can only be updated by the Terminal;
- **Shipping Line Release:** release indicator for Shipping Line, with a date if the release is completed. This can only be updated by the Terminal;
- **Terminal Release:** release indicator for Terminal, with a date if the release is completed. This can only be updated by the Terminal;
- **Full/Empty:** full or empty indicator;
- **Length:** length of the Container and the unit of measure;
- **Type:** type of Container (Reefer, Regular, Flat, Open Top, High Cube, etc.);
- **Weight:** weight of the Container and the unit of measure;
- **Dangerous Warning:** class and UN number for the product, if necessary;
- **Content:** content of the Container.

Hyperlinks:

- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen (the field is not displayed if the user logged on is a Freight Forwarder);
- **Terminal Field:** link to the Terminal Detail screen (the field is not displayed if the user logged on is a Terminal);
- **Trucking Company Field:** link to the Trucking Company Detail screen (the field is not displayed if the user logged on is a Trucking Company). The link is not active if the Trucking Company has yet to be assigned;
- **Truck Driver Assignment:** link to the Truck Driver Assignment screen. If the Driver has yet to be assigned, the link is only active for the Trucking Company, which is allowed to enter the screen to assign the Driver;
- **Trucking Company Assignment:** link to Trucking Company Assignment given by the Freight Forwarder to the Trucking Company. The link is not active if no such assignment exists (or if the user is not authorized to access it);
- **Container Log:** Link to the Container Log screen. The link is not active if there are no related events or if the user is not authorized to access related events.

Buttons:

- **Update Status:** present only for Terminal users. Confirms and updates the database for changes made to status and release fields;
- **Print Container:** prints formatted information on the Container;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within the Container list.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
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Links Go
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Container Detail
Container Number
Search
Update Status
Print Container
Back
← ↑ ↓ →
My Computer
Start
General infos - Microsoft ...
Architecture
Terminal Main Screen ...
11:58

Container Number	TRIU4351161	**Movement**	Import
Bill of Lading	198-00	**Global Status**	Grounded
Vessel Name	CANMAR COURAGE	**Customs Release**	OK 00/12/08
Voyage Number	1457-22	**Agriculture Release**	OK 00/12/08
Freight Forwarder	CPS Logistics	**Shipping Line Release**	OK 00/12/09
Trucking Company	Transpel	**Terminal Release**	OK 00/12/09
Truck Driver Assignment	Arthur Chose	**Full/Empty**	Full
Delivery/Pickup Date	00/12/25	**Length**	20'
Storage Date (if import)	00/12/27	**Type**	High Cube
Cutoff Time (if export)	00/12/27	**Weight**	215 kg
Trucking Company Assignment	**Container Log**	**Dangerous Warning**	Class 3 UN 143
		Content	If available

Figure 10 Container Detail

3.19.6 Screen: Manage Empty Memo

Diagram reference number: 6

An Empty Memo is created by the Freight Forwarder to provide information to the Trucking Company on how to handle empty Containers. With this screen, the Freight Forwarder can Add, Modify, or Delete an Empty Memo associated with a Trucking Company. For more information, see section 3.6.

This screen is only available to Freight Forwarder users and can be accessed through the side menu. The screen is launched with no context and, at first, is displayed with no information. Users wishing to add a new Empty Memo must key in all the information on the screen and click on the Add button. Users wishing to modify or delete an Empty Memo must retrieve the appropriate Empty Memo by keying in the booking number and clicking on the Search button.

The unique identification of an Empty Memo consists of the Booking number + the Freight Forwarder identifier + the Trucking Company identifier + the related export Voyage number. To perform a search and retrieve an Empty Memo, users only need key in the Booking Number. The Freight Forwarder identifier is already known as it is the same as the one of the user logged on.

The result of the search may include more than one Empty Memo, in which case a pop-up window is displayed with a list of Empty Memos to select from. The following information will help users to select the right Empty Memo from the list: Booking Number, Vessel ID, Voyage number, Trucking Company, and Completion Date.

If no Empty Memo matching the Booking number is retrieved, a detailed message is displayed.

Context:

- The screen is available only to Freight Forwarders and can be accessed from anywhere in the system through the side menu.

Search Empty Memo: With the booking number, the user may search information on a specific Empty Memo. If the Empty Memo exists and is related to the user logged on, the information is displayed:

- **Booking number:** field to key in a booking number;
- **Search button:** user clicks on this button to begin the search;
- **Message:** if the Empty Memo is not found, a detailed message is displayed.

Search criterion following Booking number search:

- Retrieves Empty Memo with the booking number keyed in. The related Freight Forwarder must be the same as the one logged on.

Database elements used for the search:

- ff actr id + freeordr booking nbr in Order to Carrier table. Order type must be free order.

Fields:

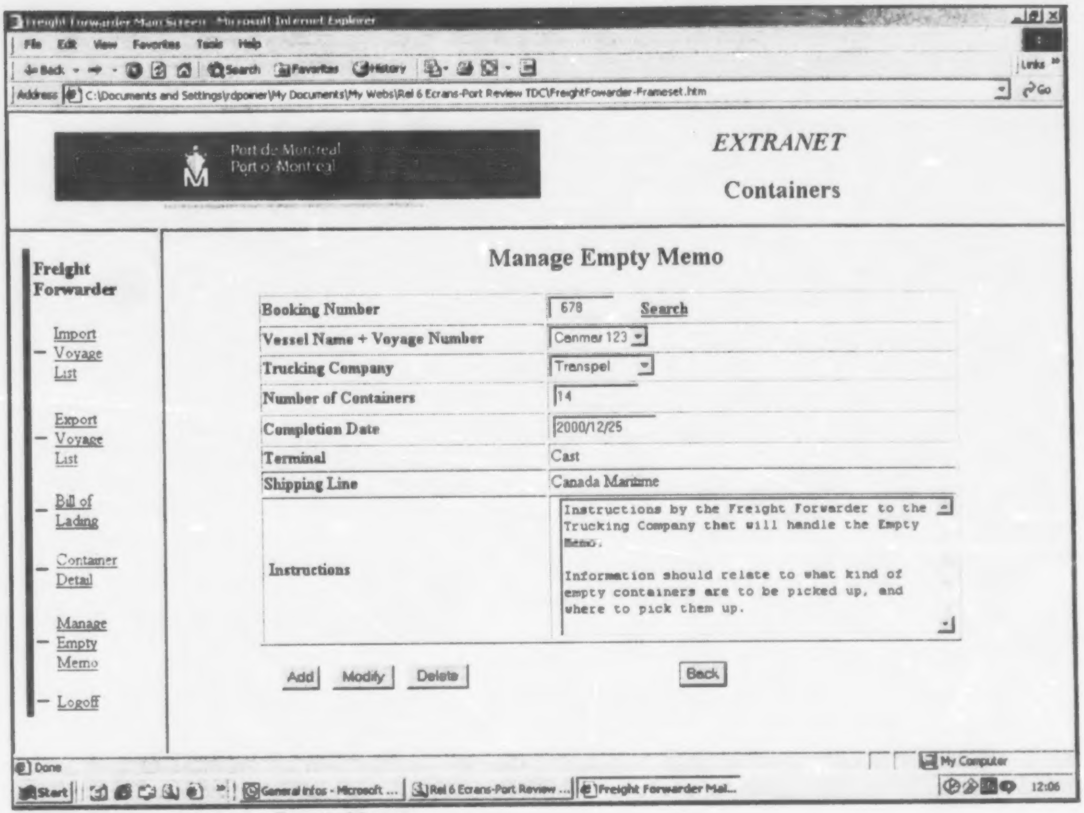
- **Booking Number:** booking number provided by the Shipping Line to the Freight Forwarder to reserve room on a ship for export. This number must be keyed in by the Freight Forwarder. Freight Forwarders can use the booking number for one or several Trucking Companies to make one or several delivery orders;
- **Vessel Name + Voyage Number:** identification of a specific Voyage. The Freight Forwarder must select the appropriate voyage from a pull-down menu;

- **Trucking Company:** name of the Trucking Company the Freight Forwarder assigns to the booking. The user must select the Trucking Company name from a pull-down menu;
- **Number of Containers:** number of Containers the Freight Forwarder wishes to assign to the Trucking Company. The information must be keyed in by the Freight Forwarder;
- **Completion Date:** date on which the Freight Forwarder expects the work related to the Empty Memo to be completed. Usually, the memo concerns picking up empties, in which case the completion date represents the date on which the Truck Driver must pick up the empty Containers. To facilitate the process, a calendar pops up to allow the user to select a date;
- **Terminal:** name of the Terminal responsible for handling the Containers at the Port of Montreal. The system retrieves the name from previous fields keyed in by the Freight Forwarder;
- **Shipping Line:** name of the Shipping Line responsible for the Voyage. The system retrieves the name from previous fields keyed in by the Freight Forwarder;
- **Instructions:** information related to the booking that the Freight Forwarder must give to the Trucking Company. This free-form text must contain information on where to pick empties up, what kind of Containers to pick up, and all other related information;
    - Example: "Pick up two empties at Cast. One must be a 20' reefer and the other one must be a 40' high cube. Special equipment required for the 20' to handle dangerous Class 123."

Hyperlink: None

Buttons:

- **Add:** creates booking information and adds it to the database;
- **Modify:** modifies booking information;
- **Delete:** deletes booking information retrieved, and displays confirmation selection before deleting;
- **Back**: takes the user back to the previous screen.


Freight Forwarder Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\FreightFowarder-Frameset.htm
Go
Port de Montréal
Port o Montreal
EXTRANET
Containers
Freight Forwarder
Import Voyage List
Export Voyage List
Bill of Lading
Container Detail
Manage Empty Memo
Logoff
Search
Add
Modify
Delete
Back
Done
My Computer
Start
General Infos - Microsoft ...
Rel 6 Ecrans-Port Review ...
Freight Forwarder Mai...
12:06

Manage Empty Memo

Booking Number	678
Vessel Name + Voyage Number	Canmar 123
Trucking Company	Transpel
Number of Containers	14
Completion Date	2000/12/25
Terminal	Cast
Shipping Line	Canada Maritime
Instructions	Instructions by the Freight Forwarder to the Trucking Company that will handle the Empty Memo. Information should relate to what kind of empty containers are to be picked up, and where to pick them up.

Figure 11 Manage Empty Memo

3.19.7 Screen: Manage Drivers

Diagram reference number: 7

A Truck Driver is defined in the Extranet by the Trucking Company that assigns Containers to Truck Drivers. With this screen, the Trucking Company can Add, Modify or Delete a Truck Driver. A Truck Driver can only be assigned to Containers by the Trucking Company that created the Truck Driver in the Extranet. For more information, see section 3.9.

This screen is only available to Trucking Company users and can be accessed through the side menu. The screen is launched with no context and, at first, is displayed with no information. Users wishing to add a new Truck Driver must key in all the information on the screen and click on the Add button. Users wishing to modify or delete a Truck Driver must retrieve the appropriate Truck Driver by keying in the employee number of the driver and clicking on the Search button.

The unique identification of a Truck Driver consists of the Employee number + the Trucking Company identifier. To search for and retrieve a Truck Driver, users may key in the employee number or the Truck Driver's name. The Trucking Company identifier is already known as it is the same as the one of the user logged on.

If no Truck Driver matching the Employee number is retrieved, a detailed message is displayed.

Context:

- The screen is available only to Trucking Companies and can be accessed from anywhere in the system through the side menu.

Search Driver: The user may retrieve information on a Truck Driver by keying in either the Employee number or the Truck Driver's name, and by clicking on the Search button next to the field. If the Truck Driver exists and is related to the user logged on, the information is displayed:

- **Employee number:** field to key in an Employee number;
- **Employee name:** field to key in a Truck Driver's name;
- **Search button:** user clicks on this button to begin the search on the Employee number or Truck Driver's name;
- **Message:** if the Truck Driver is not found, a detailed message is displayed.

Search criterion following an Employee number search:

- Retrieves the Truck Driver whose employee number is keyed in. The related Trucking Company must be the same as the one logged on.

Search criteria following a name search:

- Retrieves Truck Driver whose name is keyed in. The related Trucking Company must be the same as the one logged on.

Database elements used for the search:

- Field drvr_employee_id in Truck Driver table for Employee number;
- Field drvr employee name in Truck Driver table for Truck Driver's name;
- Field tk drvr port id + tk drvr actr id in Truck Driver table for related Trucking Company.

Fields:

- **Employee Number:** unique identification of a Truck Driver within a Trucking Company. The user may type in an employee number and click on Search to retrieve an existing Truck Driver, or type in a new employee number to add a new Truck Driver;

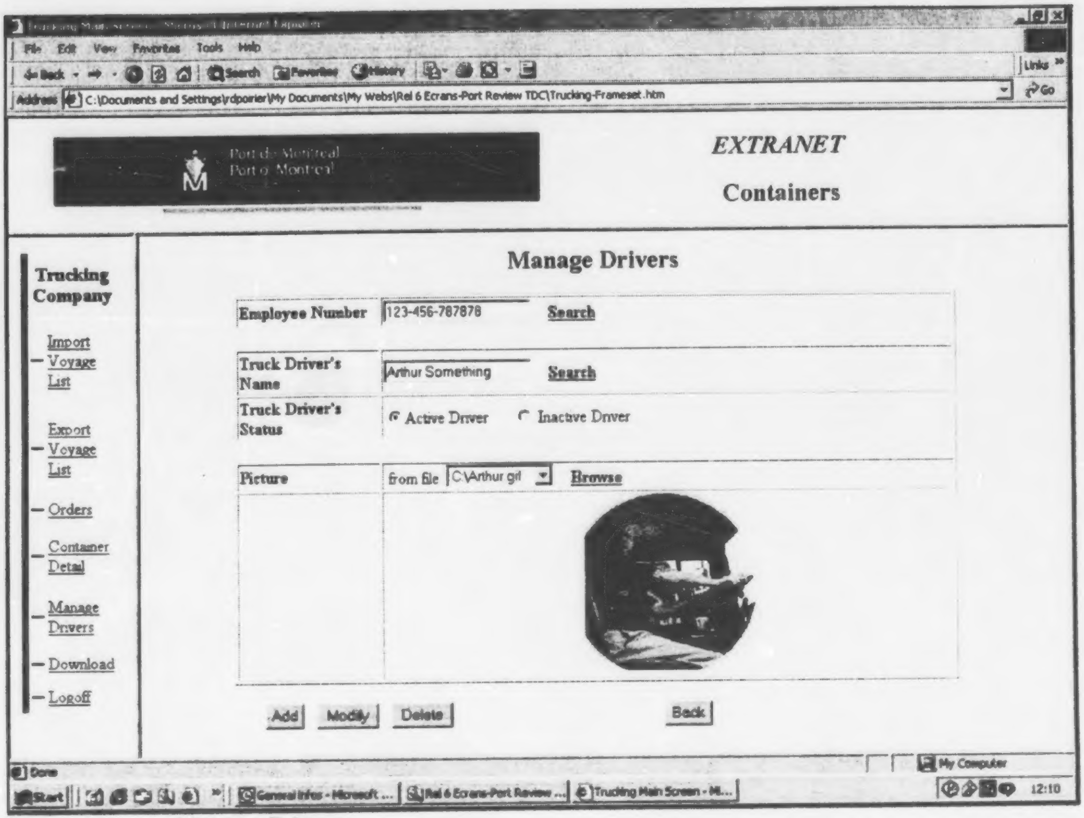
- **Truck Driver's Name:** the name of the Truck Driver is retrieved by the system following a search. In the Add process, this information is mandatory and must be keyed in by the user;
- **Truck Driver's status:** buttons indicate whether the Truck Driver is active or not within the Trucking Company. The user must select one option for a new Truck Driver. The status of an existing Truck Driver can also be changed;
- **Picture:** identifies the filename for the Driver's picture. The user must type in the information for a new Truck Driver or change the filename for an existing Truck Driver. A photo related to the filename appears below the field.

Hyperlink: None

Buttons:

- **Browse:** related to the picture filename, allows the user to retrieve the file using standard navigation;
- **Add:** creates the Truck Driver's information and adds it to the database;
- **Modify:** modifies the Truck Driver's information;
- **Delete:** deletes the Truck Driver's information, and displays a confirmation selection before deleting;
- **Back**: takes the user back to the previous screen.

Note: If a Truck Driver is currently assigned to Containers for which treatment has not been completed, the system will not allow the Truck Driver to be deleted or the status to be changed to inactive.


File Edit View Favorites Tools Help
Back Search Favorites History
Links
Go
Port de Montréal
Port of Montreal
Trucking Company
Import Voyage List
Export Voyage List
Orders
Container Detail
Manage Drivers
Download
Logoff
Add
Modify
Delete
Back
Done
My Computer
Start
General infos - Microsoft ...
Rel 6 Ecrans-Port Review ...
Trucking Main Screen - Mi...
12:10

Address: C:\Documents and Settings\rdporier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\Trucking-Frameset.htm

EXTRANET

Containers

Manage Drivers

Employee Number 123-456-787878 **Search**

Truck Driver's Name Arthur Something **Search**

Truck Driver's Status ● Active Driver ○ Inactive Driver

Picture from file C:\Arthur.gif **Browse**

Figure 12 Manage Drivers

3.19.8 Screen: Import Container List

Diagram reference number: 8

A list of import Containers is displayed on this screen and a list of import Voyages is received as a context. To be listed, a Container must be included in one of the import Voyages in the context. The Container must also be related to the user logged on. A filter that specifies a range of pickup dates is applied to shorten the list and make it more manageable. The user may modify the range and refresh the screen. Default values are one day in the past and six days in the future, resulting in a list of one week.

The user may also change the sorting criterion for the list displayed. By default, the list is sorted by Pickup Date. The user may change this criterion to Container Number, Bill of Lading, or Vessel Name.

The default values (range of dates and sorting criteria) are defined as parameters that can be changed by stakeholders.

General information related to each Container is displayed on the list: Vessel Name, Voyage Number, Bill of Lading number, Container Number, Terminal, Freight Forwarder, Trucking Company, Pickup Date, global Status, and Customs Location.

With this screen, it is possible to select one or more Containers and display the Container Detail screen with a list of selected Containers as context. The user may select any Container on the import Container list.

Context:

- Reached from the Import Voyage List screen with a list of Voyage numbers selected for context;
- Displayed after changing the Screen Selection and clicking on the Refresh button. The list of Voyages received is still active as context.

Date selection (Filter):

- Pickup Date range fields may be changed and the screens refreshed by the user to list Containers scheduled to be picked up on different dates (earlier or later).

Search criteria to create the list:

- For Terminal, Shipping Line, and Government users: for Voyages received in the context, selects all Containers. If an order exists for a Container, its date must be within the pickup range. If no order exists for a Container, the arrival date of the related Voyage must be within the pickup range;
- For Freight Forwarder users: for Voyages received in the context, selects all Containers included on the Bills of Lading related to the Freight Forwarder logged on. If an order exists for a Container, its date must be within the pickup range. If no order exists for a Container, the arrival date of the related Voyage must be within the pickup range;
- For Trucking Company users: for Voyages received in the context, selects all Containers with orders assigned to the Trucking Company logged on. The order date of a Container must be within the pickup range.

Database elements used for the search:

- Vyge vessel id + vyge nbr + unit init id + unit nbr id in Unit Summary table;

- *Vyge vessel id + vyge nbr + unit init id + unit nbr* id in Standard Suborder table in association with ff actr id + ordr id + **ordr expected achiev date** in Order to Carrier table;
- Field vyge vessel id + vyge nbr + vyge_actlexpctd_dttm for Arrival Date (expected or actual) in Voyage table.

Context for other screens:

- Containers can be selected from this screen. A context is created and may be transferred to the Container Detail screen. The context is a list of Container numbers with a related Voyage number.

Selection Criteria: The user may select two criteria to generate a more accurate list:

- **Sort:** The user may select from four sorting criteria (Pickup Date, Vessel Name, Status, or Bill of Lading). The default selection is Pickup Date;
- **Pickup Date Range:** The user may modify the range of pickup dates for the Containers displayed. The default selection is one day in the past and six days in the future;
- **Refresh button:** The user clicks on this button to refresh the list after changing the criteria.

Fields:

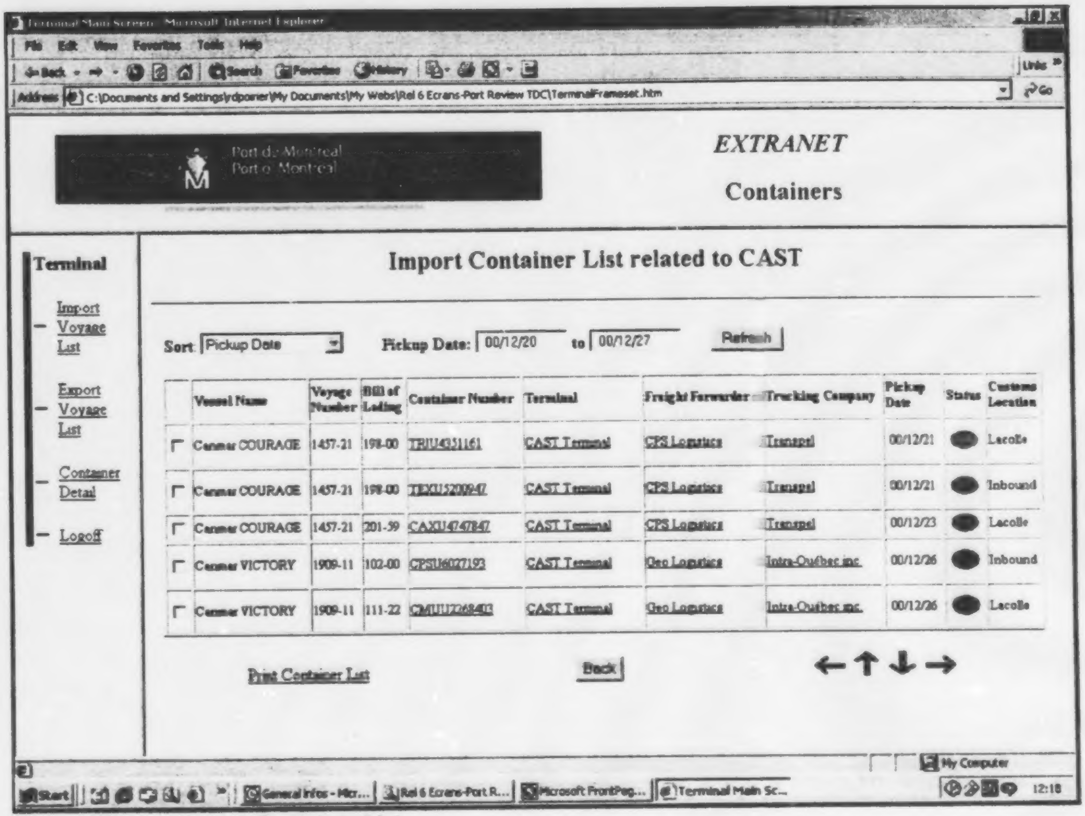
- **Related to *user's company*:** name of the user's company is displayed (CAST in Figure 13);
- **Vessel name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Bill of Lading:** number of the Bill of Lading related to the Container;
- **Container number:** number of the Container;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container and responsible for assigning the Container to a Trucking Company that will handle it to or from the Port of Montreal. This name must always appear;
- **Trucking Company:** name of the Trucking Company responsible for handling the Container to or from the Port of Montreal. The name appears only if the Freight Forwarder has made the assignment;
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. This name must always appear;
- **Pickup Date:** date on which the Truck Driver must move the Container from the Port of Montreal (Pickup or import);
- **Status:** green means that the Container is ready to be picked up, and red means it is not (see Container Detail screen for more information);
- **Customs Location:** Customs location. The field may also read Outbound if customs is being handled elsewhere (e.g., in the United States).

Hyperlinks:

- **Container Number:** link to the Container Detail screen for that specific Container number;
- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen;
- **Terminal Field:** link to the Terminal Detail screen;
- **Trucking Company Field:** link to the Trucking Company Detail screen. This link is not active if the Trucking Company has yet to be assigned.

Buttons:

- **Print Container List:** prints formatted list of Containers;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within the Container list.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address C:\Documents and Settings\ydponer\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Links
Port de Montréal
Port of Montreal
Start
General Infos - Micr...
Rel 6 Ecrans-Port R...
Microsoft FrontPag...
Terminal Main Sc...
My Computer
12:18

EXTRANET

Containers

Terminal

- Import Voyage List
- Export Voyage List
- Container Detail
- Logoff

Import Container List related to CAST

Sort: Pickup Date **Pickup Date:** 00/12/20 **to** 00/12/27 Refresh

	Vessel Name	Voyage Number	Bill of Lading	Container Number	Terminal	Freight Forwarder	Trucking Company	Pickup Date	Status	Customs Location
☐	Canmar COURAGE	1457-21	198-00	TRIU4351161	CAST Terminal	CPS Logistics	Transpel	00/12/21	●	Lacolle
☐	Canmar COURAGE	1457-21	198-00	TEXU5200947	CAST Terminal	CPS Logistics	Transpel	00/12/21	●	Inbound
☐	Canmar COURAGE	1457-21	201-59	CAXU4747847	CAST Terminal	CPS Logistics	Transpel	00/12/23	●	Lacolle
☐	Canmar VICTORY	1909-11	102-00	CPSU6027193	CAST Terminal	Geo Logistics	Intra-Québec inc.	00/12/26	●	Inbound
☐	Canmar VICTORY	1909-11	111-22	CMUU2268403	CAST Terminal	Geo Logistics	Intra-Québec inc.	00/12/26	●	Lacolle

Print Container List Back ← ↑ ↓ →

Figure 13 Import Container List

3.19.9 Screen: Export Container List

Diagram reference number: 9

A list of export Containers is displayed on this screen and a list of export Voyages is received as a context. To be listed, a Container must be included in one of the export Voyages in the context. The Container must also be related to the user logged on. A filter that specifies a range of delivery dates is applied to shorten the list and make it more manageable. The user may modify the range and refresh the screen. Default values are one day in the past and six days in the future, resulting in a list of one week.

The user may also change the sorting criterion for the list displayed. By default, the list is sorted by Delivery Date. The user may change this criterion to Container Number, Bill of Lading, or Vessel Name.

The default values (range of dates and sorting criteria) are defined as parameters that can be changed by stakeholders.

General information related to each Container is displayed on the list: Vessel Name, Voyage Number, Bill of Lading number, Container Number, Terminal, Freight Forwarder, Trucking Company, Delivery Date, and global Status.

With this screen, it is possible to select one or more Containers and display the Container Detail screen with a list of selected Containers as context. The user may select any Container on the export Container list.

From this screen, the user may access the Empty Memo List screen. The list of export Voyages that is the context in the Export Container list will also be the context of the Empty Memo list.

Contexts:

- Reached from the Export Voyage List or Empty Memo List screens with a list of Voyage numbers selected for context;
- Displayed after changing the Screen Selection and clicking on the Refresh button. The list of Voyages received is still active as context.

Date selection:

- Delivery Date range fields may be changed and the screens refreshed by the user to list Containers scheduled to bedelivered on different dates (earlier or later).

Search criteria to create the list:

- For Terminal, Shipping Line, and Government users: for Voyages received in the context, selects all Containers. If an order exists for a Container, its date must be within the delivery range. If no order exists for a Container, the departure date of the related Voyage must be within the delivery range;
- For Freight Forwarder users: for Voyages received in the context, selects all Containers included on the Bills of Lading related to the Freight Forwarder logged on. If an order exists for a Container, its date must be within the delivery range. If no order exists for a Container, the departure date of the related Voyage must be within the delivery range;
- For Trucking Company users: for Voyages received in the context, selects all Containers with orders assigned to the Trucking Company logged on. The order date of a Container must be within the delivery range.

Database elements used for the search:

- Vyge vessel id + vyge nbr + unit init id + unit nbr id in Unit Summary table;
- Vyge vessel id + vyge nbr + unit init id + unit nbr id in Standard Suborder table in association with ff actr id + ordr id + **ordr expected achiev date** in Order to Carrier table;
- Field vyge vessel id + vyge nbr + vyge_actlexpctd_dttm for Departure Date (expected or actual) in Voyage table.

Contexts for other screens:

- Containers can be selected from this screen. A context is created and may be transferred to the Container Detail screen. The context is a list of Container numbers with a related Voyage number;
- If the user navigates through the Empty Memo List screen, the actual context (list of Voyage numbers) is transferred.

Selection Criteria: The user may select two criteria to generate a more accurate list:

- **Sort:** The user may select from four sorting criteria (Delivery Date, Vessel Name, Status, or Bill of Lading). The default selection is Delivery Date;
- **Delivery Date Range:** The user may modify the range of delivery dates for the Containers displayed. The default selection is one day in the past and six days in the future;
- **Refresh button:** The user clicks on this button to refresh the list after changing the criteria.

Fields:

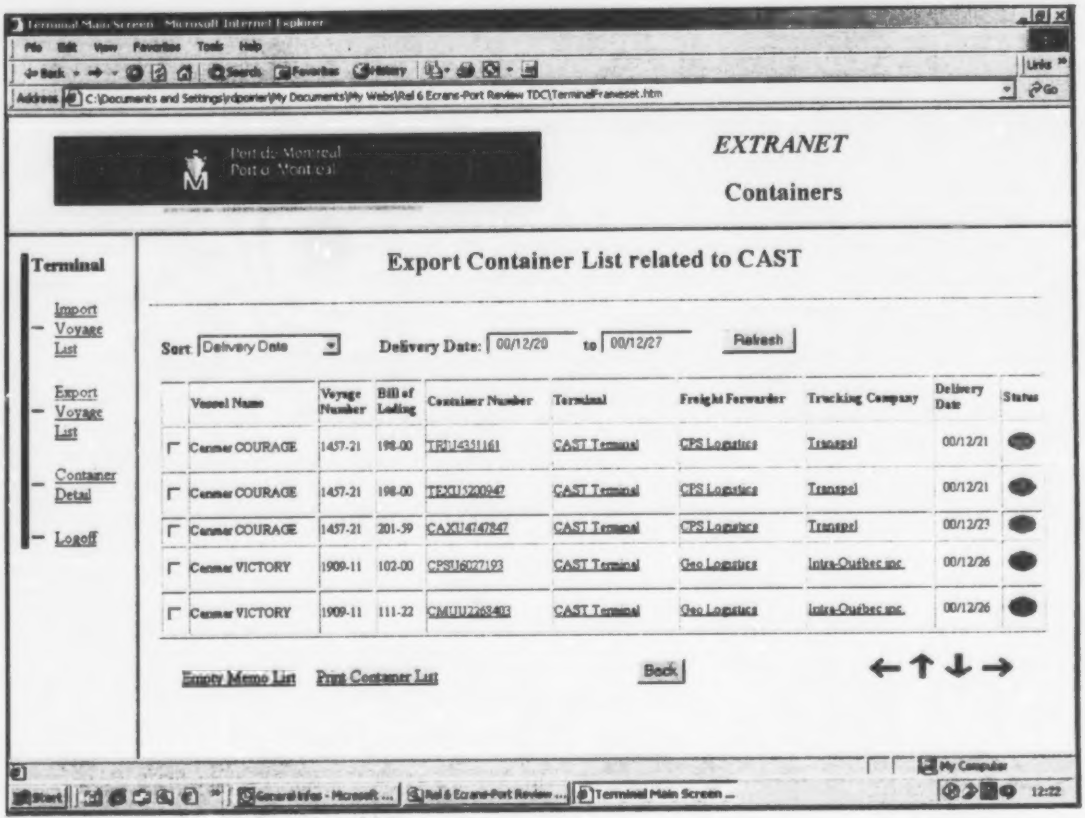
- **Related to *user's company***: name of the user's company is displayed (CAST in Figure 14);
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Bill of Lading:** number of the Bill of Lading related to the Container;
- **Container Number:** number of the Container;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container and responsible for assigning the Container to a Trucking Company that will handle it to or from the Port of Montreal. This name must always appear;
- **Trucking Company:** name of the Trucking Company responsible for handling the Container to or from the Port of Montreal. This name appears only if the Freight Forwarder has made the assignment;
- **Terminal:** name of the Terminal responsible for handling the related Container at the Port of Montreal. This name must always appear;
- **Delivery Date:** date on which the Truck Driver must move the Container to the Port of Montreal (Delivery or export);
- **Status:** green means that the Container is ready fto be delivered, and red means that it is not (see Container Detail screen for more information).

Hyperlinks:

- **Container Number Field:** link to the Container Detail screen for that specific Container number;
- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen;
- **Terminal Field:** link to the Terminal Detail screen;
- **Trucking Company Field:** link to the Trucking Company Detail screen. This link is not active if the Trucking Company has yet to be assigned.

Buttons:

- **Empty Memo List:** launches the Empty Memo List screen, usingvVoyages selected as context;
- **Print Container List:** prints formatted list of Containers;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within Container list.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\rdporter\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Port de Montréal
Port of Montreal
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
My Computer
Start
General Infos - Microsoft ...
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
12:22

EXTRANET

Containers

Export Container List related to CAST

Sort: Delivery Date **Delivery Date:** 00/12/20 **to** 00/12/27 Refresh

	Vessel Name	Voyage Number	Bill of Lading	Container Number	Terminal	Freight Forwarder	Tracking Company	Delivery Date	Status
☐	Canmar COURAGE	1457-21	198-00	TRIU4351161	CAST Terminal	CPS Logistics	Transpel	00/12/21	●
☐	Canmar COURAGE	1457-21	198-00	TEXU5200947	CAST Terminal	CPS Logistics	Transpel	00/12/21	●
☐	Canmar COURAGE	1457-21	201-59	CAXU4747847	CAST Terminal	CPS Logistics	Transpel	00/12/23	●
☐	Canmar VICTORY	1909-11	102-00	CPSU6027193	CAST Terminal	Geo Logistics	Intra-Québec inc.	00/12/26	●
☐	Canmar VICTORY	1909-11	111-22	CMUU2268403	CAST Terminal	Geo Logistics	Intra-Québec inc.	00/12/26	●

Empty Memo List Print Container List Back ← ↑ ↓ →

Figure 14 Export Container List

3.19.10 Screen: Empty Memo List

Diagram reference number: 10

This screen displays a list of summary information on existing Empty Memos created by Freight Forwarders to provide instructions on how to handle empties.

Empty Memos may only exist for export Voyages. A list of export Voyages is received as a context. To be listed, an Empty Memo must be included in one of the Voyages in the context. The Empty Memo must also be related to the user logged on. A filter that specifies a range of completion dates is applied to shorten the list and make it more manageable The user may modify the range and refresh the screen. Default values are one day in the past and six days in the future, resulting in a list of one week.

The user may also change the sorting criterion for the list displayed. By default the list is sorted by Booking Number. The user may change this criterion to Completion Date or Vessel Name.

General information related to each Empty Memo is displayed on the list: Vessel Name, Voyage Number, Booking Number, Bill of Lading number, Number of Containers in the booking, Terminal, Freight Forwarder, Trucking Company, Completion Date, and a link to the free-form Instructions related to the Empty Memo.

From this screen, the user may access the Export Container List screen. The list of export Voyages being used as context is then transferred to that screen as its context.

Contexts:

- Reached from the Export Voyage List or Export Container List screens with a list of Voyage numbers selected for context;
- Displayed after changing the Screen Selection and clicking on the Refresh button. The list of Voyages received is still active as context.

Date selection (Filter):

- Completion Date range fields may be changed and the screens refreshed by the user to list Empty Memos scheduled for other dates (earlier or later).

Search criteria to create the list:

- For Terminal, Shipping Line, and Government users: for Voyages received in the context, selects all bookings. The booking date must be within the completion date range;
- For Freight Forwarder users: for Voyages received in the context, selects all Empty Memos related to the Freight Forwarder logged on. The Empty Memo completion date must be within the completion date range;
- For Trucking Company users: for Voyages received in the context, selects all Empty Memos related to the Trucking Company logged on. The Empty Memo completion date must be within the completion date range.

Database elements used for the search:

- Freeordr vyge vessel id + freeordr vyge nbr + ordr expected achiev dt in Order to Carrier table;
- Ff port id + ff actr id in Order to Carrier table to compare to Freight Forwarder logged on;
- Carrier port id + carrier actr id in Order to Carrier table to compare to Trucking Company logged on.

Context for other screens:

- If the user navigates through the Export Container List screen, the context (list of Voyage numbers) is transferred.

Selection Criteria: The user may select two criteria to generate a more accurate list:

- **Sort:** The user may select from three sorting criteria (Booking Number, Completion Date, or Vessel Name). The default selection is the Completion Date of the Empty Memo;
- **Completion Date Range:** The user may modify the range of Completion Dates for which Empty Memos displayed. The default selection is one day in the past and six days in the future;
- **Refresh button:** The user clicks on this button to refresh the list after changing the criteria.

Fields:

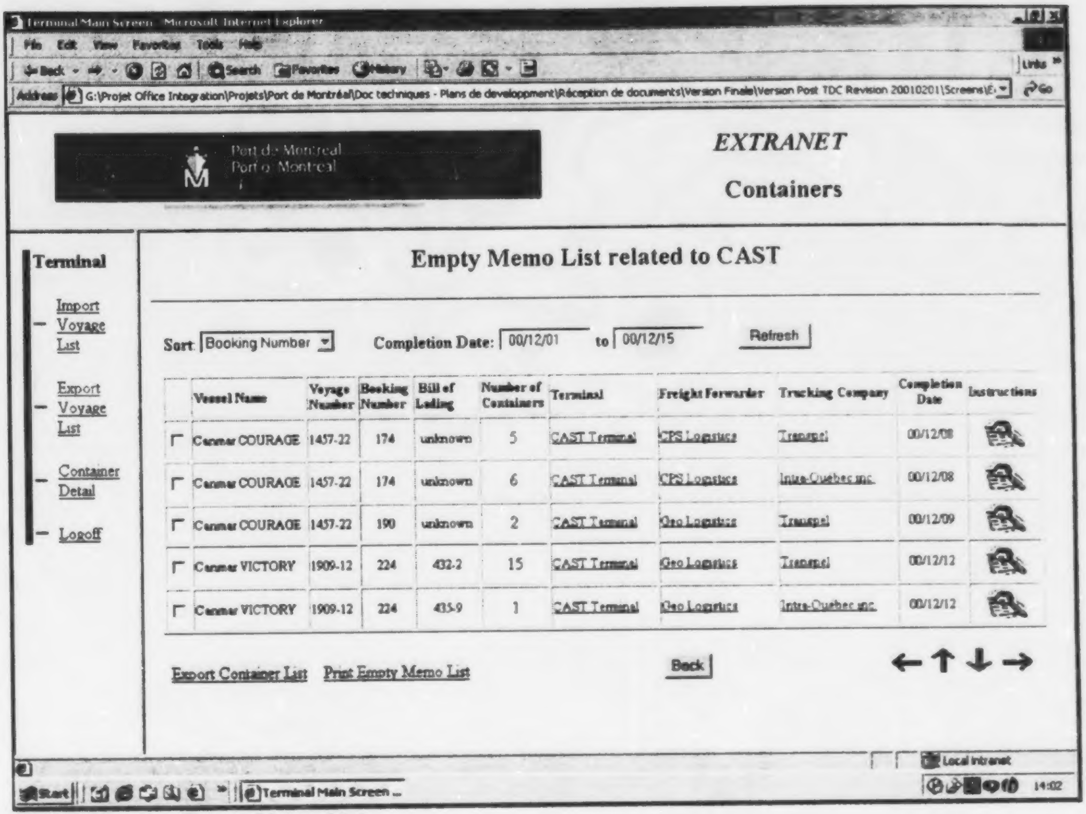
- **Related to *user's company*:** name of the user's company is displayed (CAST in Figure 15);
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line ;
- **Booking Number:** number of the booking as keyed in by the Freight Forwarder;
- **Bill of Lading:** number of the Bill of Lading related to the Booking number. This is already known if the Bills of Lading are received from the Shipping Line;
- **Number of Container:** number of Containers included in the booking (specific to the Trucking Company);
- **Freight Forwarder:** name of the Freight Forwarder related to the booking and responsible for creating the booking in the system;
- **Trucking Company:** name of the Trucking Company responsible for handling the booking to or from the Port of Montreal. The name appears only if the Freight Forwarder has made the assignment;
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. This name must always appear;
- **Completion Date:** date to complete the work related to the Empty Memo.

Hyperlinks:

- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen;
- **Terminal Field:** link to the Terminal Detail screen;
- **Trucking Company Field:** link to the Trucking Company Detail screen. This link is not active if the Trucking Company has yet to be assigned;
- **Instructions Field:** link to the Empty Memo Instructions screen to display information on a specific Empty Memo regarding how to handle empties and other instructions.

Buttons:

- **Export Container List:** launches the Export Container List screen using Voyages selected as context;
- **Print Empty Memo List:** prints formatted list of Empty Memos;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within the Empty Memo list.



EXTRANET

Containers

Terminal

- Import Voyage List
- Export Voyage List
- Container Detail
- Logoff

Empty Memo List related to CAST

Sort: Booking Number

Completion Date: 00/12/01 to 00/12/15

	Vessel Name	Voyage Number	Booking Number	Bill of Lading	Number of Containers	Terminal	Freight Forwarder	Trucking Company	Completion Date	Instructions
☐	Canmar COURAGE	1457-22	174	unknown	5	CAST Terminal	CPS Logistics	Transpel	00/12/08	
☐	Canmar COURAGE	1457-22	174	unknown	6	CAST Terminal	CPS Logistics	Intra-Quebec inc.	00/12/08	
☐	Canmar COURAGE	1457-22	190	unknown	2	CAST Terminal	Geo Logistics	Transpel	00/12/09	
☐	Canmar VICTORY	1909-12	224	432-2	15	CAST Terminal	Geo Logistics	Transpel	00/12/12	
☐	Canmar VICTORY	1909-12	224	435-9	1	CAST Terminal	Geo Logistics	Intra-Quebec inc.	00/12/12	

Export Container List   Print Empty Memo List

Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address G:\Projet Office Integration\Projets\Port de Montréal\Doc techniques - Plans de developpment\Réception de documents\Version Finale\Version Post TDC Revision 20010201\Screens\E
Go
Port de Montreal
Port of Montreal
Refresh
Back
← ↑ ↓ →
Local intranet
Start
Terminal Main Screen ...
14:02

Figure 15 Empty Memo List

3.19.11 Screen: Shipping Line Detail

Diagram reference number: 11

This screen displays information on a Shipping Line to any other stakeholder that wishes to contact or obtain general information on that Shipping Line. There are **no restrictions** as to what type of users may access this screen as long as they are properly logged on.

The only way to access this screen is by clicking on a Shipping Line name related to a Voyage through the Export Voyage List or Import Voyage List. Because the field is a hyperlink, a context is received with the correct Shipping Line identification. From there, the appropriate Shipping Line information can be retrieved.

General information related to the Shipping Line is displayed: name, general telephone number, address, and web site if available. One to three contact names related to the Shipping Line may exist. Information is displayed on each of them: name, telephone number, e-mail address, position in the Shipping Line Company, fax number, and city in which the contact person is located.

Two e-mail addresses are defined for alerts. They are used if the Extranet detects events that necessitate sending an alert to the Shipping Line. For each e-mail address, the preferred language of correspondence (English or French) is specified. The fields dedicated to alert information are visible only to Shipping Line users.

The information displayed on this screen is defined by the Extranet administrator during the stakeholder's registration on the Extranet. The Shipping Line is responsible for providing the administrator with the initial information and any changes made afterward.

Context:

- Accessed from the export or import Voyage list using the hyperlink in the Shipping Line field. The name of the Shipping Line is received in the context.

Search criteria to fill in the screen:

- Retrieves the Actor and the related contact persons corresponding to the Shipping Line identification received in the context.

Database elements used for the search:

- The type of role must be 'SL' for Shipping Line. Field Actr_role_cd in Actor table;
- Port id + actr id in Actor table must match the Shipping Line identifier received in the context. Synm expression in Name Synonym table to make the match.

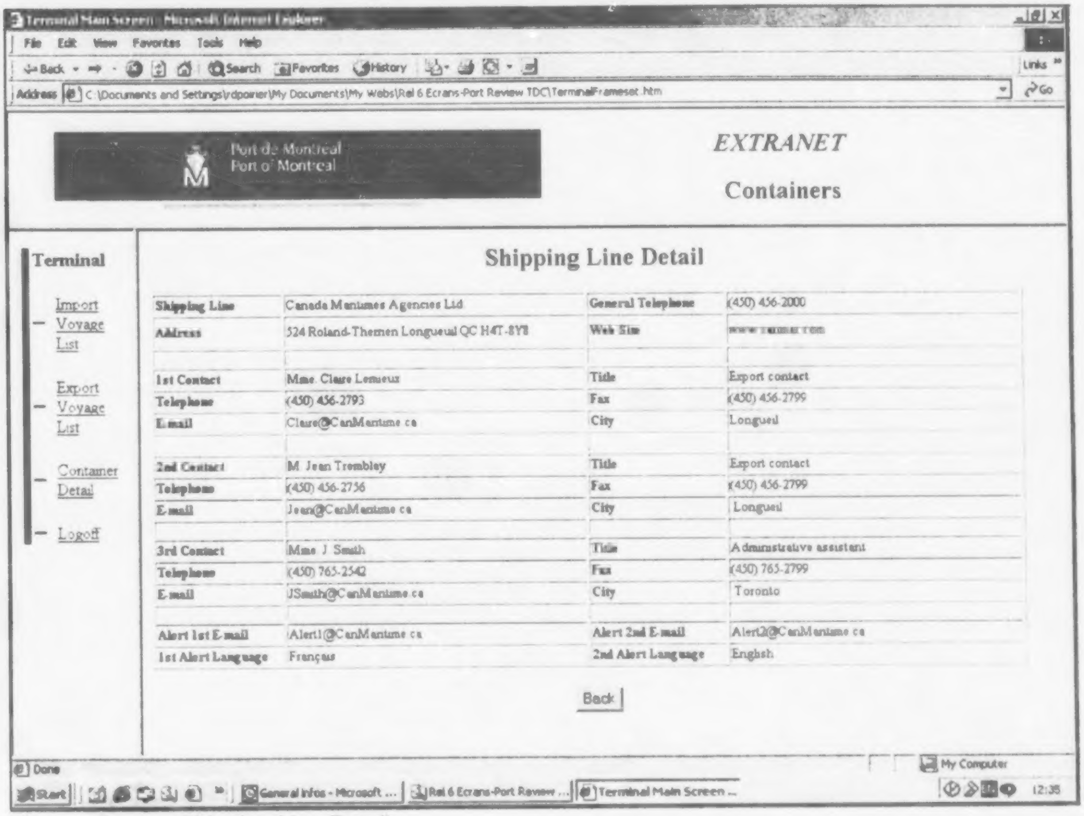
Fields:

- **Shipping Line:** name of the Shipping Line;
- **General Telephone:** general telephone number of the Shipping Line;
- **Address:** address of the Shipping Line;
- **Web site:** web site of the Shipping Line, if available.
- **Fields for one to three contacts:**
    - **Contact:** contact name;
    - **Telephone:** contact telephone number;
    - **E-mail:** contact e-mail address;
    - **Title:** title or responsibilities of the contact person;
    - **Fax:** contact fax number;
    - **City:** location of the contact.

- **Alert information fields:**
    - **1st E-mail:** first e-mail address to send alerts;
    - **1st Alert Language:** language of correspondence for the first e-mail;
    - **2nd E-mail:** second e-mail address to send alerts;
    - **2nd Alert Language:** language of correspondence for the second e-mail.

Button:

- **Back**: takes the user back to the previous screen.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Links
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Back
Done
My Computer
Start
General Infos - Microsoft ...
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
12:35

Shipping Line Detail

Shipping Line	Canada Maritimes Agencies Ltd	**General Telephone**	(450) 456-2000
Address	524 Roland-Therrien Longueuil QC H4T-8Y8	**Web Site**	[illegible]
1st Contact	Mme. Claire Lemieux	**Title**	Export contact
Telephone	(450) 456-2793	**Fax**	(450) 456-2799
E-mail	Claire@CanMaritime.ca	**City**	Longueuil
2nd Contact	M. Jean Trembley	**Title**	Export contact
Telephone	(450) 456-2756	**Fax**	(450) 456-2799
E-mail	Jean@CanMaritime.ca	**City**	Longueuil
3rd Contact	Mme. J. Smith	**Title**	Administrative assistant
Telephone	(450) 765-2542	**Fax**	(450) 765-2799
E-mail	JSmith@CanMaritime.ca	**City**	Toronto
Alert 1st E-mail	Alert1@CanMaritime.ca	**Alert 2nd E-mail**	Alert2@CanMaritime.ca
1st Alert Language	Français	**2nd Alert Language**	English

Figure 16 Shipping Line Detail

3.19.12 Screen: Trucking Company Detail

Diagram reference number: 12

This screen displays information on a Trucking Company to any other stakeholder that wishes to contact or obtain general information on that Trucking Company. There are **no restrictions** as to what type of users may access this screen as long as they are properly logged on.

The only way to access this screen is through the Export Container List, Import Container List, Empty Memo List, or Container Detail screen by clicking on a Trucking Company name related to a Container. Because the field is a hyperlink, a context is received with the correct Trucking Company identification. From there, the appropriate Trucking Company information can be retrieved.

General information related to the Trucking Company is displayed: name, general telephone number, address, and web site if available. One to three contact names related to the Trucking Company may exist. Information is displayed on each of them: name, telephone number, e-mail address, position in the Trucking Company, fax number, and city in which the contact person is located.

Two e-mail addresses are defined for alerts. They are used if the Extranet detects events that necessitate sending an alert to the Trucking Company. For each e-mail address, the preferred language of correspondence (English or French) is specified. The fields dedicated to alert information are visible only to Trucking Company users.

The information displayed on this screen is defined by the Extranet administrator during the stakeholder's registration on the Extranet. The Trucking Company is responsible for providing the administrator with the initial information and any changes made afterward.

Context:

- Accessed from the Container List (export or import), Empty Memo List, or Container Detail screen using the hyperlink on the Trucking Company field.

Search criteria to fill in the screen:

- Retrieves the Actor and the related contact persons corresponding to the Trucking Company identification received in the context.

Database elements used for the search:

- The type of role must be 'TK' for Trucking Company. Field Actr_role_cd in Actor table;
- Port id + actr id in Actor table must match the Trucking Company identifier received in the context. Synm expression in Name Synonym table to make the match.

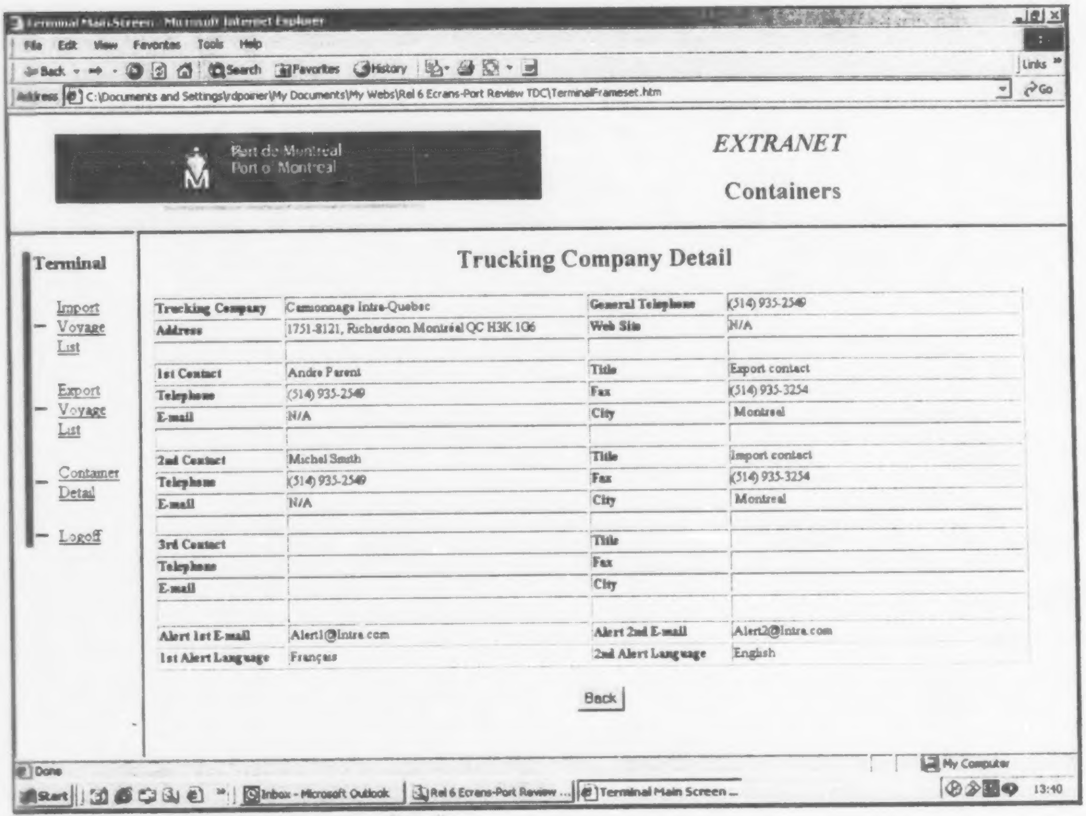
Fields:

- **Trucking Company:** name of the Trucking Company;
- **General Telephone:** general telephone number of the Trucking Company;
- **Address:** address of the Trucking Company;
- **Web site:** web site of the Trucking Company, if available.
- **Fields for one to three contacts:**
  - **Contact:** contact name;
  - **Telehone:** contact telephone number;
  - **E-mail:** contact e-mail address;
  - **Title:** title or responsibilities of the contact person;
  - **Fax:** contact fax number;
  - **City:** location of the contact.

- **Alert information field:**
    - **1st E-mail:** first e-mail address to send alerts;
    - **1st Alert Language:** language of correspondence for the first e-mail;
    - **2nd E-mail:** second e-mail address to send alerts;
    - **2nd Alert Language:** language of correspondence for the second e-mail.

Button:

- **Back**: takes the user back to the previous screen.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
13:40

Trucking Company Detail

Trucking Company	Camionnage Intra-Quebec	**General Telephone**	(514) 935-2549
Address	1751-8121, Richardson Montréal QC H3K 1G6	**Web Site**	N/A
1st Contact	Andre Parent	**Title**	Export contact
Telephone	(514) 935-2549	**Fax**	(514) 935-3254
E-mail	N/A	**City**	Montreal
2nd Contact	Michel Smith	**Title**	Import contact
Telephone	(514) 935-2549	**Fax**	(514) 935-3254
E-mail	N/A	**City**	Montreal
3rd Contact		**Title**	
Telephone		**Fax**	
E-mail		**City**	
Alert 1st E-mail	Alert1@Intra.com	**Alert 2nd E-mail**	Alert2@Intra.com
1st Alert Language	Français	**2nd Alert Language**	English

Figure 17 Trucking Company Detail

3.19.13 Screen: Terminal Detail

Diagram reference number: 13

This screen displays information on a Terminal to any other stakeholder that wishes to contact or obtain general information on that Terminal. There are **no restrictions** as to what type of users may access this screen as long as they are properly logged on.

The only way to access this screen is through the Export Container List, Import Container List, Empty Memo List, or Container Detail screen by clicking on a Terminal name related to a Container. Because the field is a hyperlink, a context is received with the correct Terminal identification. From there, the appropriate Terminal information can be retrieved.

General information related to the Terminal is displayed: name, general telephone number, address, and web site if available. One to three contact names related to the Terminal may exist. Information is displayed on each of them: name, telephone number, e-mail address, position in the Terminal Company, fax number, and city in which the contact person is located.

Two e-mail addresses are defined for alerts. They are used if the Extranet detects events that necessitate sending alerts to the Terminal. For each e-mail address, the preferred language of correspondence (English or French) is specified. The fields dedicated to alert information are visible only to the Terminal users.

The information displayed on this screen is defined by the Extranet administrator during the stakeholder's registration on the Extranet. The Terminal is responsible for providing the administrator with the initial information and any changes made afterward.

Context:

- Accessed from the Container List (export or import), Empty Memo List, or Container Detail screen using the hyperlink on the Terminal field.

Search criteria to fill in the screen:

- Retrieves the Actor and the related contact persons corresponding to the Terminal identification received in the context.

Database elements used for the search:

- The type of role must be 'TE' for Terminal. Field Actr_role_cd in Actor table;
- Port id + actr id in Actor table must match Terminal identifier received in the context. Synm expression in Name Synonym table to make the match.

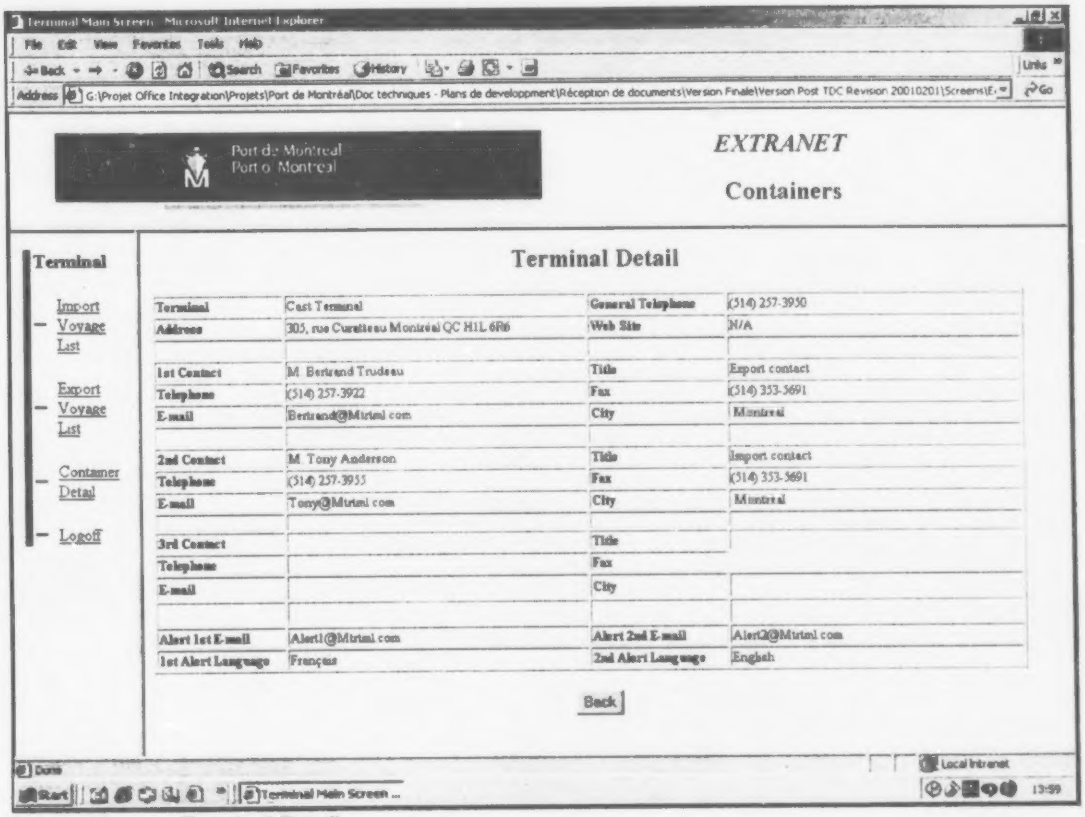
Fields:

- **Terminal:** name of the Terminal;
- **General Telephone:** general telephone number of the Terminal;
- **Address:** address of the Terminal;
- **Web site:** web site of the Terminal, if available.
- **Fields for one to three contacts:**
    - **Contact:** contact name;
    - **Telephone:** contact telephone number;
    - **E-mail:** contact e-mail address;
    - **Title:** title or responsibilities of the contact person;
    - **Fax:** contact fax number;
    - **City:** location of the contact person.

- **Alert information fields:**
    - **1st E-mail:** first e-mail address to send alerts;
    - **1st Alert Language:** language of correspondence for the first e-mail;
    - **2nd E-mail:** second e-mail address to send alerts;
    - **2nd Alert Language:** language of correspondence for the second e-mail.

Button:

- **Back**: takes the user back to the previous screen.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address G:\Projet Office Integration\Projets\Port de Montréal\Doc techniques - Plans de developpment\Réception de documents\Version Finale\Version Post TDC Revision 20010201\Screens\E
Go
Port de Montreal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Back
Done
Local intranet
Start
Terminal Main Screen ...
13:59

Terminal Detail

Terminal	Cast Terminal	**General Telephone**	(514) 257-3950
Address	305, rue Curatteau Montréal QC H1L 6R6	**Web Site**	N/A
1st Contact	M. Bertrand Trudeau	**Title**	Export contact
Telephone	(514) 257-3922	**Fax**	(514) 353-5691
E-mail	Bertrand@Mtrtml.com	**City**	Montreal
2nd Contact	M. Tony Anderson	**Title**	Import contact
Telephone	(514) 257-3955	**Fax**	(514) 353-5691
E-mail	Tony@Mtrtml.com	**City**	Montreal
3rd Contact		**Title**	
Telephone		**Fax**	
E-mail		**City**	
Alert 1st E-mail	Alert1@Mtrtml.com	**Alert 2nd E-mail**	Alert2@Mtrtml.com
1st Alert Language	Français	**2nd Alert Language**	English

Figure 18 Terminal Detail

3.19.14 Screen: Freight Forwarder Detail

Diagram reference number: 14

This screen displays information on a Freight Forwarder to any other stakeholder that wishes to contact or obtain general information on that Freight Forwarder. There are **no restrictions** as to what type of users may access this screen as long as they are properly logged on.

The only way to access this screen is through the Export Container List, Import Container List, Empty Memo List, or Container Detail screen by clicking on a Freight Forwarder name related to a Container. Because the field is a hyperlink, a context is received with the correct Freight Forwarder identification. From there, the appropriate Freight Forwarder information can be retrieved.

General information related to the Freight Forwarder is displayed: name, general telephone number, address, and web site if available. One to three contact names related to the Freight Forwarder may exist. Information is displayed on each of them: name, telephone number, e-mail address, position in the Freight Forwarder Company, fax number, and city in which the contact person is located.

Two e-mail addresses are defined for alerts. They are used if the Extranet detects events that necessitate sending alerts to the Freight Forwarder. For each e-mail address, the preferred language of correspondence (English or French) is specified. The fields dedicated to alert information are visible only to Freight Forwarder users.

The information displayed on this screen is defined by the Extranet administrator during the stakeholder's registration on the Extranet. The Freight Forwarder is responsible for providing the administrator with the initial information and any changes made afterward.

Context:

- Accessed from the Container List (export or import), Empty Memo List, or Container Detail screen using the hyperlink on the Freight Forwarder field.

Search criteria to fill in the screen:

- Retrieves the Actor and the related contact persons corresponding to the Freight Forwarder identification received in the context.

Database elements used for the search:

- The type of role must be 'FF' for Freight Forwarder. Field Actr_role_cd in Actor table;
- Port id + actr id in Actor table must match the Freight Forwarder identifier received in the context. Synm expression in Name Synonym table to make the match.

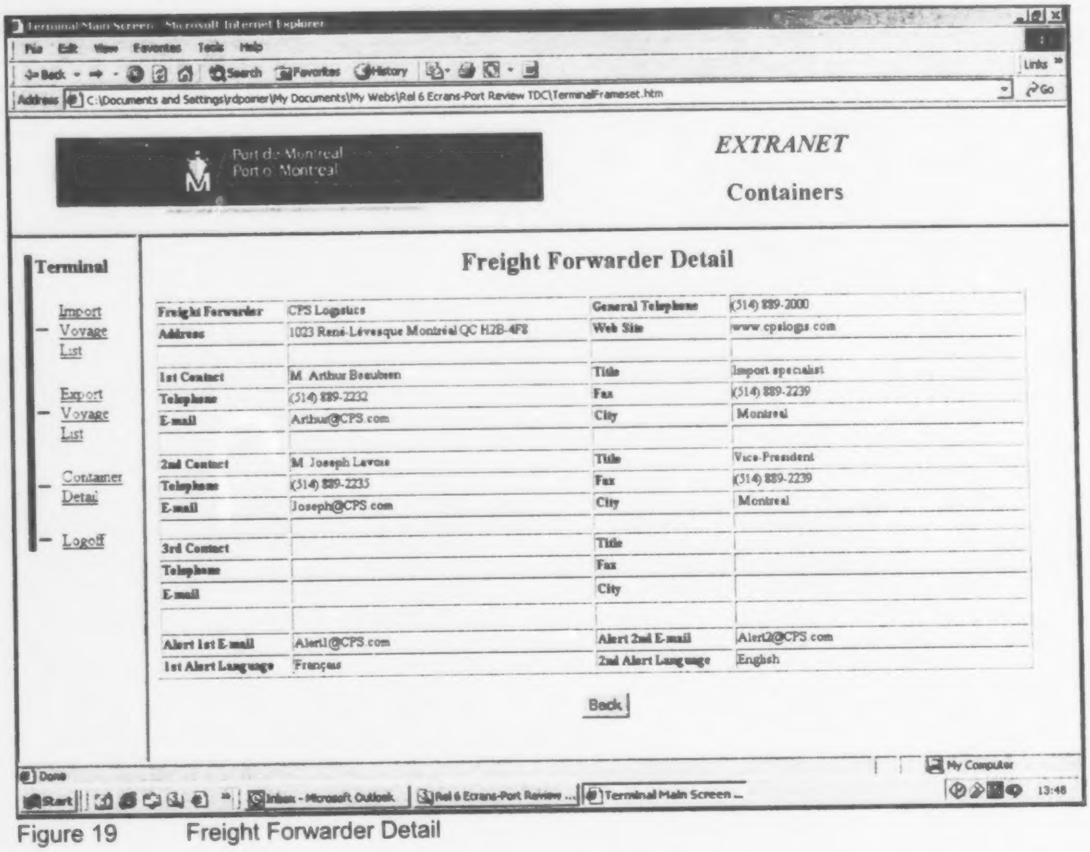
Fields:

- **Freight Forwarder:** name of the Freight Forwarder;
- **General Telephone:** general telephone number of the Freight Forwarder;
- **Address:** address of the Freight Forwarder;
- **Web site:** web site of the Freight Forwarder, if available.
- **Fields for one, two or three contacts:**
    - **Contact:** contact name;
    - **Telephone:** contact telephone number;
    - **E-mail:** contact e-mail address;
    - **Title:** title or responsibilities of the contact person;
    - **Fax:** contact fax number;
    - **City:** location of the contact person.

- **Alert information fields:**
    - **1st E-mail:** first e-mail address to send alerts;
    - **1st Alert Language:** language of correspondence for the first e-mail;
    - **2nd E-mail:** second e-mail address to send alerts;
    - **2nd Alert Language:** language of correspondence for the second e-mail.

Button:

- **Back**: takes the user back to the previous screen.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
13:48

Freight Forwarder Detail

Freight Forwarder	CPS Logistics	**General Telephone**	(514) 889-2000
Address	1023 René-Lévesque Montréal QC H2B-4F8	**Web Site**	www.cpslogis.com
1st Contact	M. Arthur Beaubien	**Title**	Import specialist
Telephone	(514) 889-2232	**Fax**	(514) 889-2239
E-mail	Arthur@CPS.com	**City**	Montreal
2nd Contact	M. Joseph Lavoie	**Title**	Vice-President
Telephone	(514) 889-2235	**Fax**	(514) 889-2239
E-mail	Joseph@CPS.com	**City**	Montreal
3rd Contact		**Title**	
Telephone		**Fax**	
E-mail		**City**	
Alert 1st E-mail	Alert1@CPS.com	**Alert 2nd E-mail**	Alert2@CPS.com
1st Alert Language	Français	**2nd Alert Language**	English

Figure 19 Freight Forwarder Detail

3.19.15 Screen: Truck Driver Assignment Detail

Diagram reference number: 15

A Truck Driver Assignment is defined by the Trucking Company. It specifies which Truck Driver will handle a specific Container and provides all related instructions to be given to the Truck Driver. This allows Terminal staff to authenticate the Truck Driver at the gate. With this screen, the Trucking Company can assign or delete the assignment of a Truck Driver to a specific Container, or modify the information on an existing assignment. For more information, see section 3.8.

Stakeholders other than the Trucking Company may access this screen for information purposes but they cannot update any information. Users must be related to the Container to view the information displayed on this screen.

The only way to access this screen is through the Container Detail screen. The contexts received for this screen are the Voyage number and the Container number, which ensure that the correct Truck Driver Assignment is displayed.

If no Truck Driver Assignment exists for a specific Container, the Truck Driver's name does not appear on the Container Detail screen. The Truck Driver Assignment Detail screen cannot be accessed by users (except the Trucking Company) because no hyperlink is defined in the Container Detail screen. For Trucking Company users, the hyperlink is always there to provide access to the Truck Driver Assignment Detail screen to define a new Truck Driver Assignment.

Context:

- Accessed from Container Detail screen using the hyperlink on the Truck Driver Assignment field. If the user logged on is a Trucking Company, information can be updated on the screen.

Search criteria:

- Retrieves the Instruction to Truck Driver related to the Voyage Number and Container Number received in the context.

Database elements used for the search:

- Ff port id + ff actr id + ordr id + stdsubord_line_nbr in Subinstruction table related to the Standard Suborder (vyge vessel id + vyge nbr + unit init id + unit nbr id);
- Information in Instruction to Truck Driver for the retrieved Subinstruction (with key instr id).

Fields:

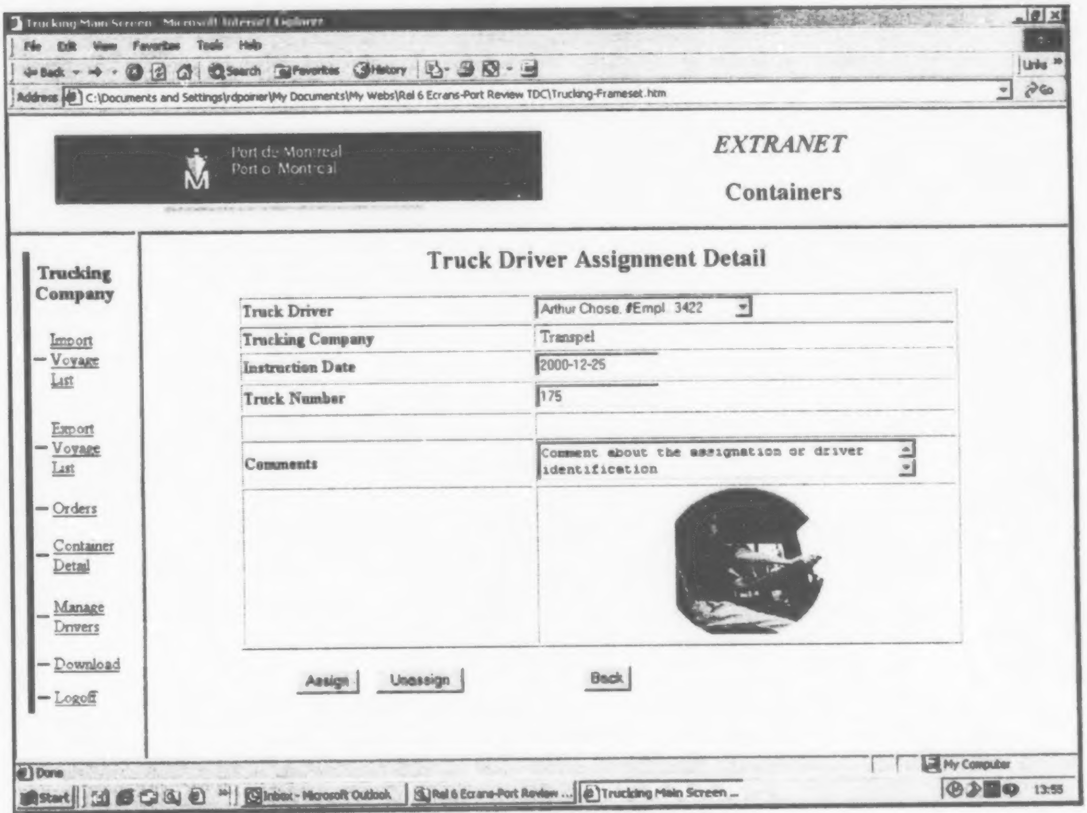
- **Truck Driver:** combination of the Truck Driver's name and employee number. This field can only be modified by Trucking Company users, who can select a name from the pull-down list of existing Truck Drivers;
- **Trucking Company:** name of the Trucking Company for which the Truck Driver works;
- **Instruction Date:** date on which the Instruction related to the Container must be executed by the Truck Driver (e.g., for an import Voyage it will be a pickup date and for an export it will be a delivery date);
- **Truck Number:** number of the truck that the Truck Driver will use to handle the Container. The Trucking Company user must key in the number when assigning a Truck Driver to a Container;
- **Comments:** comments related to the Truck Driver's assignment to the Container are free-form and provide any relevant information. This field can only be modified by

Trucking Company users, who will key in special instructions explaining what to do with the Container;

- **Driver's picture:** picture of the Truck Driver assigned to the Container. This display-only field is retrieved by the system for Trucking Company users who assign Truck Drivers.

Buttons:

- **Assign:** appears only for Trucking Company users. Allows the user to confirm and save information about the Truck Driver Assignment in the database;
- **Unassign:** appears only for Trucking Company users. Allows the user to cancel the current Truck Driver Assignment for the Container;
- **Back**: takes the user back to the previous screen.


Trucking Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\Trucking-Frameset.htm
Go
Port de Montreal
Port o Montreal
EXTRANET
Containers
Trucking Company
Import Voyage List
Export Voyage List
Orders
Container Detail
Manage Drivers
Download
Logoff
Assign
Unassign
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Trucking Main Screen ...
13:55

Truck Driver Assignment Detail

Truck Driver	Arthur Chose. #Empl. 3422
Trucking Company	Transpel
Instruction Date	2000-12-25
Truck Number	175
Comments	Comment about the assignation or driver identification

Figure 20 Truck Driver Assignment Detail

3.19.16 Screen: Trucking Company Assignment

Diagram reference number: 16

A Trucking Company Assignment is defined by the Freight Forwarder. It specifies which Trucking Company will handle a specific Container and provides all related instructions to be given to the Trucking Company. This allows the Trucking Company to assign a Truck Driver to the Container. With this screen, the Freight Forwarder can assign or delete the assignment of a Trucking Company to a specific Container, or modify the information on an existing assignment. For more information, see section 3.5.

Stakeholders other than the Freight Forwarder may access this screen for information purposes only but they cannot update any information. Users must be related to the Container to view the information displayed on this screen.

The only way to access this screen is through the Container Detail screen. The contexts received for this screen are the Voyage number and the Container number, which ensure that the correct Trucking Company Assignment is displayed.

If no Trucking Company Assignment exists for a specific Container, the Trucking Company's name does not appear on the Container Detail screen. The Trucking Company Assignment screen cannot be accessed by users (except the Freight Forwarder) because no hyperlink is defined in the Container Detail screen. For Freight Forwarder users, the hyperlink is always there to provide access to the Trucking Company Assignment screen to define a new Trucking Company Assignment.

Context:

- Accessed from the Container Detail screen using the icon that appears beside the Trucking Company Assignment label. If the user logged on is a Freight Forwarder, information can be updated on the screen.

Search criteria:

- Retrieves the Order to Carrier related to the Voyage Number and Container Number received in the context.

Database elements used for the search:

- Vyge vessel id + vyge nbr + unit init id + unit nbr id in Standard Suborder table;
- Ff port id + ff actr id + ordr id in Order Carrier table related to the Standard Suborder.

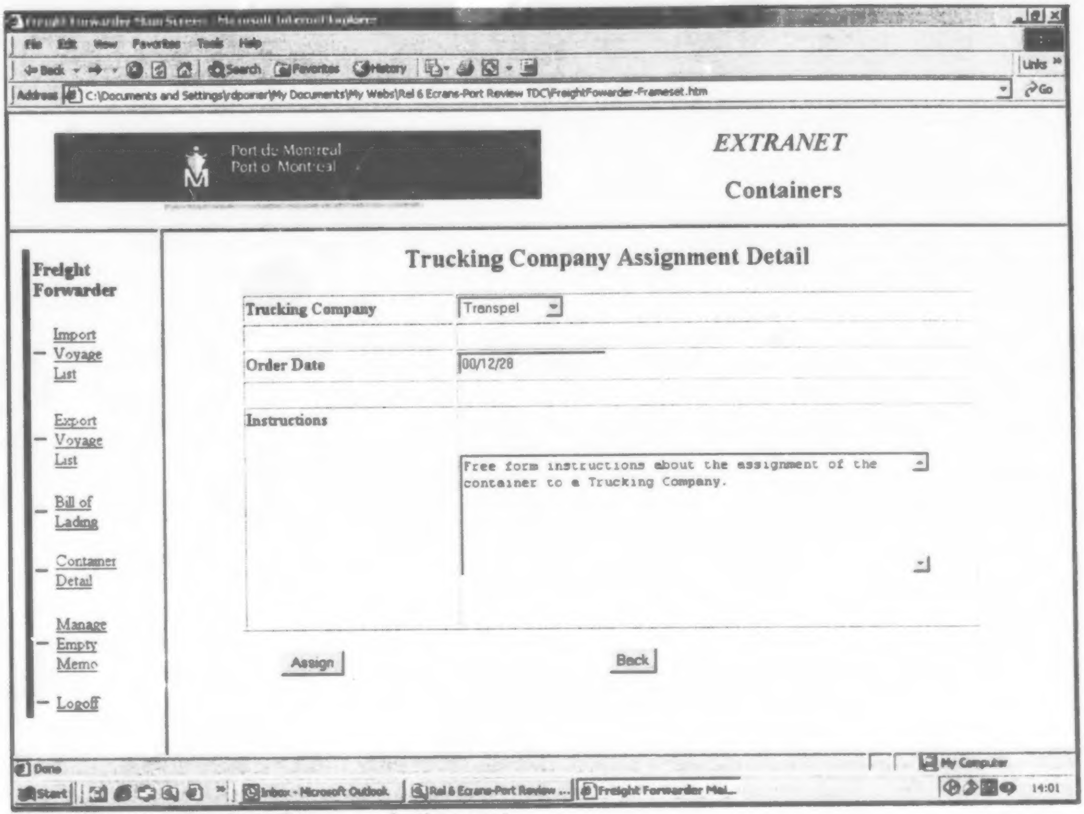
Fields:

- **Trucking Company:** name of the Trucking Company assigned to the Container. The Freight Forwarder may assign or modify this name using the pull-down list;
- **Order Date:** date on which the order related to the Container must be executed by the Trucking Company (e.g., for an import Voyage it will be a pickup date and for an export it will be a delivery date);
- **Instructions:** instructions related to the Container's assignment to a Trucking Company by the Freight Forwarder are free-form and contain any relevant information. This field can only be modified by Freight Forwarder users who will key in special instructions explaining what to do with the Container;

Buttons:

- **Assign:** appears only for Freight Forwarder users. Allows the user to confirm and save information about the Trucking Company Assignments in the database;

- **Back**: takes the user back to the previous screen.


Freight Forwarder Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\dpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\FreightFowarder-Frameset.htm
Go
Port de Montreal
Port o Montreal
EXTRANET
Containers
Freight Forwarder
Import Voyage List
Export Voyage List
Bill of Lading
Container Detail
Manage Empty Memo
Logoff
Assign
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Freight Forwarder Mai...
14:01

Trucking Company Assignment Detail

Trucking Company	Transpel
Order Date	00/12/28
Instructions	Free form instructions about the assignment of the container to a Trucking Company.

Figure 21 Trucking Company Assignment

3.19.17 Screen: Container Log

Diagram reference number: 17

Purpose: Displays information for all events relating to the Container in the context of a specific Voyage.

Context:

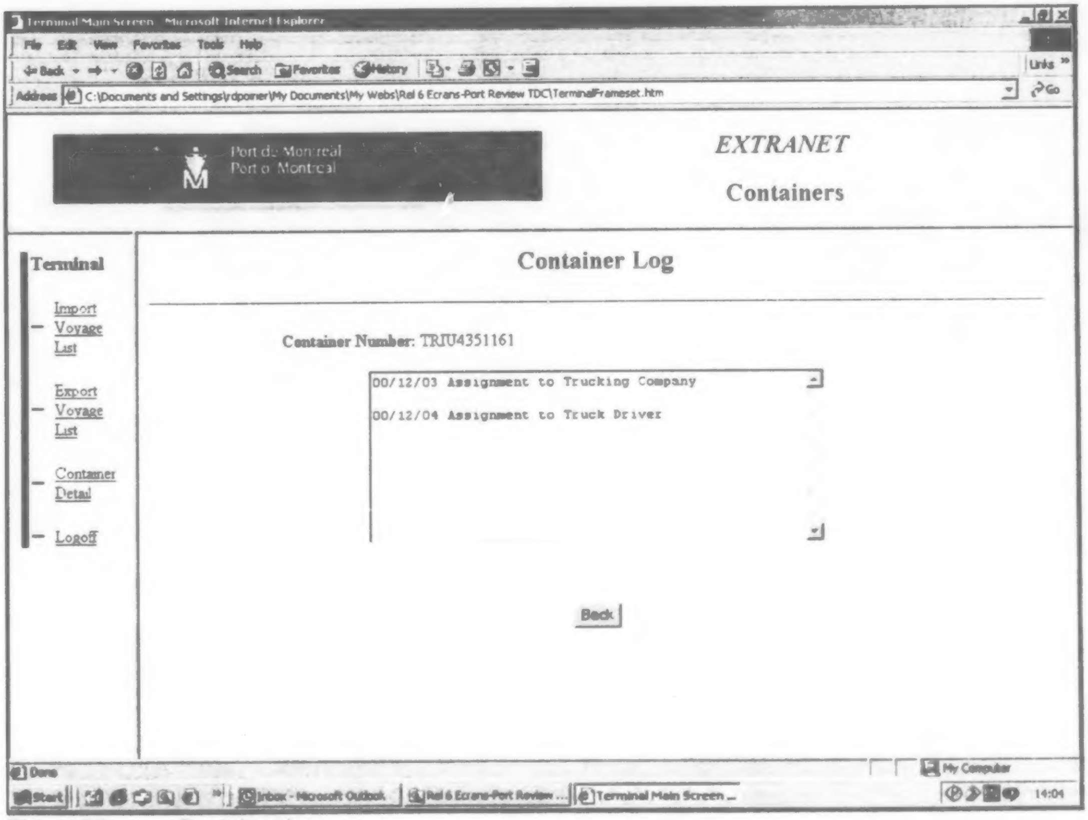
- Accessed from the Container Detail screen using the icon that appears beside the Container Log label.

Fields:

- **Container Number:** number of the Container whose log is displayed;
- **Container Log:** one line of information for each event related to the Container, including the user who entered it and a time stamp. Events include status changes, releases, Trucking Company assignments, Truck Driver assignments, etc.

Button:

- **Back**: takes the user back to the previous screen.


Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Port de Montréal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
14:04

Container Log

Container Number: TRIU4351161

```
00/12/03 Assignment to Trucking Company

00/12/04 Assignment to Truck Driver
```

Figure 22 Container Log

3.19.18 Screen: Empty Memo Instructions

Diagram reference number: 18

Purpose: Displays the Empty Memo instructions related to a booking as entered by the Freight Forwarder when the booking was assigned to a Trucking Company.

For more information on Empty Memos, see section 3.6.

Users will most often view the summary information on Empty Memos on the Empty Memo List screen. When details of the instructions for a specific Empty Memo are required, users may access this screen through the hyperlink on the Empty Memo List screen.

Context:

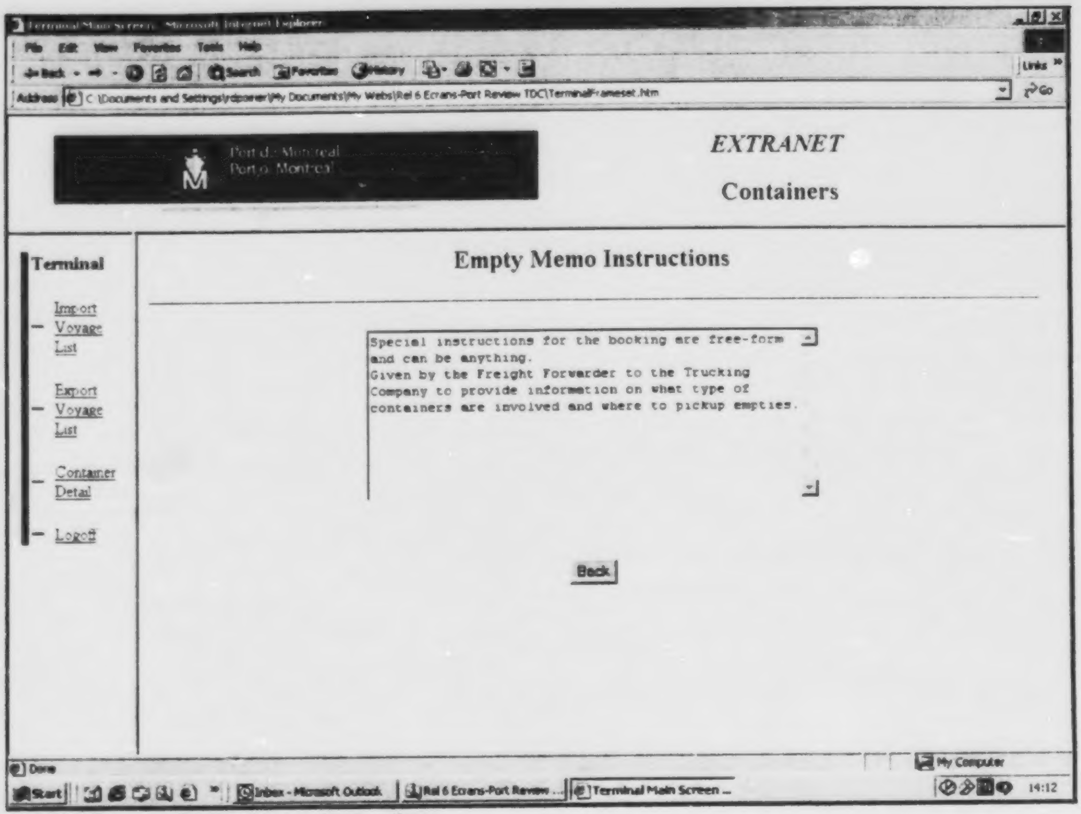
- Accessed from the Empty Memo List screen using the icon in the Instructions column that corresponds to the appropriate Empty Memo.

Fields:

- **Empty Memo Instructions:** instructions related to an Empty Memo assigned to a Trucking Company by the Freight Forwarder are free-form and contain any relevant information. The display-only field must contain information on where to pick up empties, what kind of Containers are to be picked up, and all other relevant information;
    - Example: "Pick up two empties at Cast. One must be a 20' reefer and the other one must be a 40' high cube. Special equipment required for the 20' to handle dangerous Class 123."

Buttons:

- **Back**: takes the user back to the previous screen.



Terminal Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address C:\Documents and Settings\rdpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\TerminalFrameset.htm
Go
Port de Montreal
Port of Montreal
EXTRANET
Containers
Terminal
Import Voyage List
Export Voyage List
Container Detail
Logoff
Empty Memo Instructions
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Terminal Main Screen ...
14:12

```
Special instructions for the booking are free-form
and can be anything.
Given by the Freight Forwarder to the Trucking
Company to provide information on what type of
containers are involved and where to pickup empties.
```

Figure 23 Empty Memo Instructions

3.19.19 Screen: Trucking Orders

Diagram reference number: 19

This screen displays a list of Containers included in a specific Order. The only stakeholder allowed to access this screen through the side menu is the Trucking Company.

This screen is useful to Trucking Companies that work with Order numbers, not Container numbers. In the current design of the Extranet application, one Order always includes one and only one Container.

As no context is received for this screen, when it is accessed it displays no information. The user must key in an Order number and perform a search. If the search is successful, Containers related to the Order are listed. If the search is not successful, a detailed message is displayed.

To perform a successful search, not only must the Order number match in the database, the Order retrieved must also be related to the same Trucking Company as the one logged on.

The Order for which the user will perform a search may be related to an import Voyage or an export Voyage, since Orders exist for both kinds of Voyages.

General information related to each Container is displayed on the list: Vessel Name, Voyage Number, Bill of Lading number, Container Number, Freight Forwarder, Terminal, Trucking Company, Order Date, global Status, and Customs Location (for import only).

With this screen, users may select one or more Containers and access the Container Detail screen with a list of Containers selected as context. Users may select any Container on the list.

Context:

- Reached from the side menu and accessible only by Trucking Company users. No context is received.

Search criteria to create the list:

- For Trucking Company users: selects all Containers included in the Order related to the Order number keyed in. The Trucking Company related to the Order must be the same as the one logged on.

Database elements used for the search:

- Field order_id in Order to Carrier table for Order number, and carrier port id + carrier actr id for the Trucking Company;
- Field ordr id for related Standard Suborder.

Context for other screens:

- Containers can be selected from this screen. A context is created and may be given to the Container Detail screen. The context is a list of Container numbers with a related Voyage number.

Search Order Number: The user search for information on a specific Order by entering a specific Order Number. If the order exists and is related to the user logged on, the information is displayed:

- **Order Number:** field to key in an Order number;
- **Search button:** user clicks on this button to launch the search.

Fields:

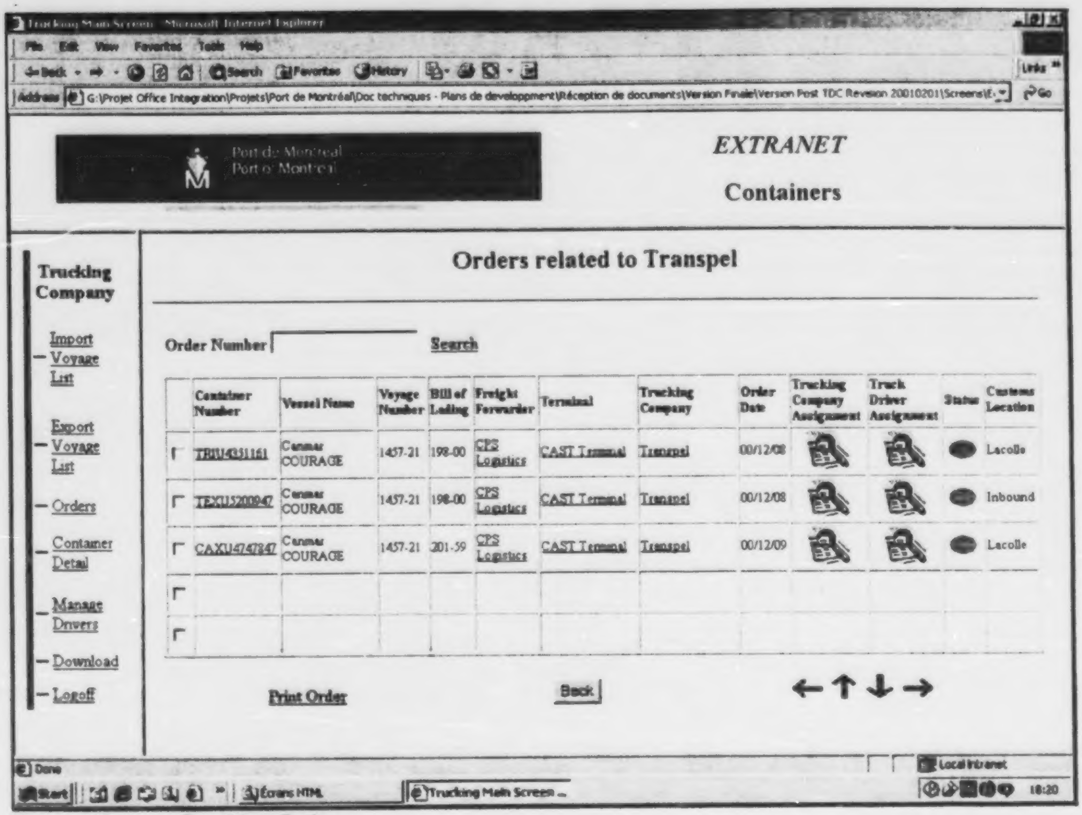
- **Related to *user's company***: name of the user's company is displayed (Transpel in Figure 24);
- **Container Number:** number of the Container;
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping Line;
- **Bill of Lading:** number of the Bill of Lading related to the Container;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container and responsible for assigning the Container to a Trucking Company that will handle it to or from the Port of Montreal. This name must always appear;
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. This name must always appear;
- **Trucking Company:** name of the Trucking Company responsible for handling the Container to or from the Port of Montreal. The name appears only if the Freight Forwarder has made the assignment;
- **Order Date:** date on which the Truck Driver must move the Container to or from the Port of Montreal. (pickup for import or delivery for export);
- **Status:** green means that the Container is ready, and red means that it is not (see Container Detail screen for more information);
- **Customs Location**: Customs location.

Hyperlinks:

- **Container Number Field:** link to the Container Detail screen for that specific Container number;
- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen;
- **Terminal Field:** link to the Terminal Detail screen;
- **Trucking Company Field:** link to the Trucking Company Detail screen;
- **Trucking Company Assignment:** link to Trucking Company Assignment screen to view details of the instructions given by the Freight Forwarder to the Trucking Company;
- **Truck Driver Assignment:** link to the Truck Driver Assignment Detail screen for Trucking Companies to view, add, delete, or modify instructions to the Truck Driver related to the Container.

Buttons:

- **Print Order:** prints a formatted list of Containers for that specific Order;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within the Container list.


Trucking Main Screen - Microsoft Internet Explorer
File
Edit
View
Favorites
Tools
Help
Back
Search
Favorites
History
Links
Address
G:\Projet Office Integration\Projets\Port de Montréal\Doc techniques - Plans de developpment\Réception de documents\Version Finale\Version Post TDC Revision 20010201\Screens\E
Go
Port de Montréal
Port of Montreal
Done
Local intranet
Start
Écrans HTML
Trucking Main Screen ...
18:20

EXTRANET

Containers

Trucking Company

- Import Voyage List
- Export Voyage List
- Orders
- Container Detail
- Manage Drivers
- Download
- Logoff

Orders related to Transpel

Order Number ____ Search

	Container Number	Vessel Name	Voyage Number	Bill of Lading	Freight Forwarder	Terminal	Trucking Company	Order Date	Trucking Company Assignment	Truck Driver Assignment	Status	Customs Location
☐	TRIU4351161	Canmar COURAGE	1457-21	198-00	CPS Logistics	CAST Terminal	Transpel	00/12/08	🔍	🔍	●	Lacolle
☐	TEXU5200947	Canmar COURAGE	1457-21	198-00	CPS Logistics	CAST Terminal	Transpel	00/12/08	🔍	🔍	●	Inbound
☐	CAXU4747847	Canmar COURAGE	1457-21	201-59	CPS Logistics	CAST Terminal	Transpel	00/12/09	🔍	🔍	●	Lacolle
☐												
☐												

Print Order

Back

← ↑ ↓ →

Figure 24 Trucking Orders

3.19.20 Screen: Bill of Lading

Diagram reference number: 20

This screen displays a list of Containers included in a specific Bill of Lading. The only stakeholder allowed to access this screen through the side menu is the Freight Forwarder. This screen is defined especially for Freight Forwarders who use Bills of Lading as a natural way of grouping Containers.

As no context is received for this screen, when it is accessed it displays no information. The user must key in the number of a Bill of Lading and perform a search. If the search is successful, Containers related to the Bill of Lading are listed. If the search is not successful, a detailed message is displayed.

To perform a successful search, not only must the Bill of Lading number match in the database, the Bill of Lading retrieved must also be related to the same Freight Forwarder as the one logged on. The Shipping Line must have sent the corresponding Bill of Lading transaction to the Extranet prior to the search.

The Bill of Lading for which the user will perform a search may be related to an import Voyage or an export Voyage, since Bills of Lading exist for both kinds of Voyages.

General information related to each Container is displayed in the list: Vessel Name, Voyage Number, Bill of Lading number, Container Number, Terminal, Freight Forwarder, Trucking Company, Order Date, global Status, and Customs Location (for import only).

With this screen, users may select one or more Containers and access the Container Detail screen with a list of Container numbers selected as context. Users may select any Container on the list.

Context:

- Reached from the side menu and accessible only by Freight Forwarder users. No context is received.

Search criteria to create the list:

- For Freight Forwarder users: selects all Containers included in the Bill of Lading related to the Bill of Lading number keyed in. The Freight Forwarder related with the Bill of Lading must be the same as the one logged on.

Database elements used for the search:

- Field bldng_nbr in Bill of Lading table for Bill of Lading number, and ff port id + ff actr id for the Freight Forwarder;
- Vyge vessel id + vyge nbr + bldng nbr + init init id + unit nbr id for related Containers in Unit Summary.

Context for other screens:

- Containers can be selected from this screen. A context is created and may be transferred to the Container Detail screen. The context is a list of Container numbers with a related Voyage number.

Search Bill of Lading Number: The user may search for information on a specific Bill of Lading by entering a specific Bill of Lading number. If it exists and is related to the user logged on, the information is displayed:

- **Bill of Lading Number:** field to key in a Bill of Lading number;

- **Search button:** user clicks on this button to launch the search.

Fields:

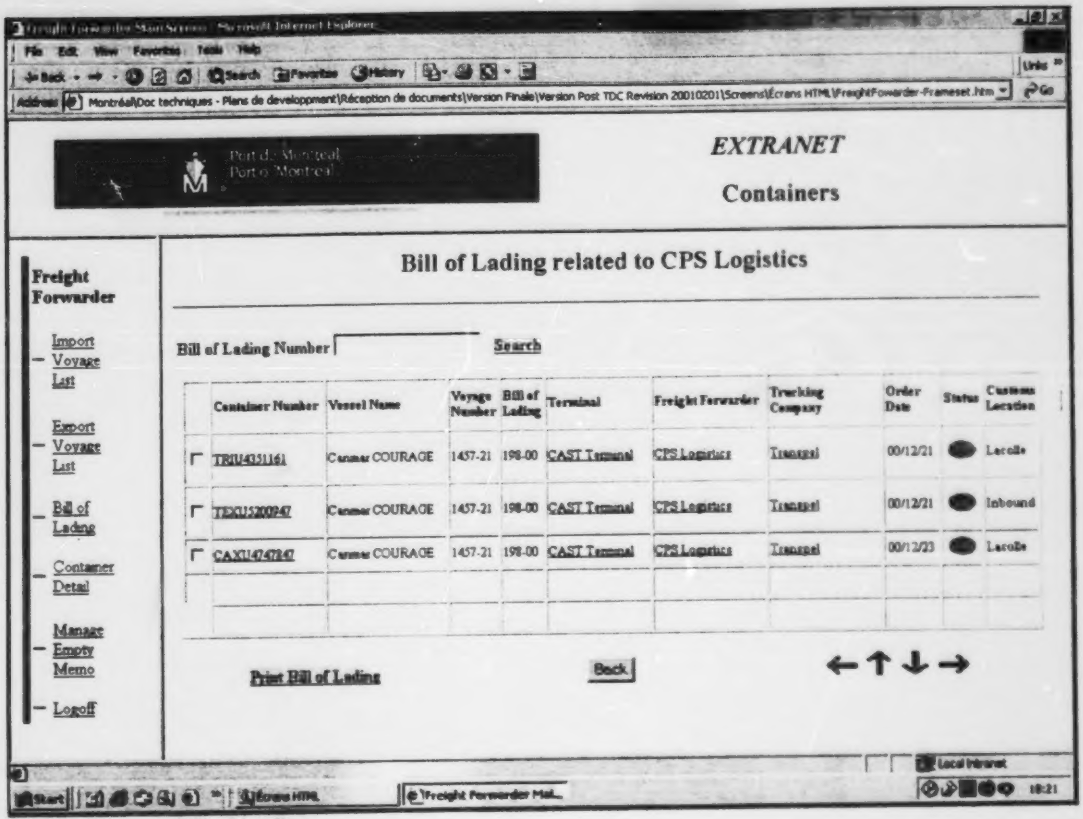
- **Related to *user's company***: name of the user's company is displayed (CPS Logistics in Figure 25);
- **Container number:** number of the Container;
- **Vessel Name:** name of the vessel, as sent by the Shipping Line;
- **Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is provided by the Shipping;
- **Bill of Lading:** number of the Bill of Lading related to the Container;
- **Trucking Company:** name of the Trucking Company responsible for handling the Container to or from the Port of Montreal. The name appears only if the Freight Forwarder has made the assignment;
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. This name must always appear;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container and responsible for assigning the Container to a Trucking Company that will handle it to or from the Port of Montreal. This name must always be appear;
- **Order Date:** date on which the Truck Driver must move the Container to or from the Port of Montreal (pickup for import or delivery for export);
- **Status:** green means that the Container is ready, and red means that it is not (see Container Detail screen for more information).
- **Customs Location**: Customs location.

Hyperlinks:

- **Container Number Field:** link to the Container Detail screen for that specific Container number;
- **Trucking Company Field:** link to the Trucking Company Detail screen. This link is not active if the Trucking Company has yet to be assigned;
- **Terminal Field:** link to the Terminal Detail screen;
- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen.

Buttons:

- **Print Bill of Lading:** prints a formatted list of Containers for that specific Bill of Lading;
- **Back**: takes the user back to the previous screen;
- **Four arrows:** allow the user to navigate within Containers list.



Freight Forwarder Main Screen - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Links
Address Montréal\Doc techniques - Plans de developpment\Réception de documents\Version Finale\Version Post TDC Revision 20010201\Screens\Écrans HTML\FreightFowarder-Frameset.htm
Go
Port de Montreal
Port of Montreal
Freight Forwarder
Import Voyage List
Export Voyage List
Bill of Lading
Container Detail
Manage Empty Memo
Logoff
Search
Print Bill of Lading
Back
← ↑ ↓ →
Local intranet
Start
Freight Forwarder Mai...
18:21

EXTRANET

Containers

Bill of Lading related to CPS Logistics

Bill of Lading Number

	Container Number	Vessel Name	Voyage Number	Bill of Lading	Terminal	Freight Forwarder	Trucking Company	Order Date	Status	Customs Location
☐	TRIU4351161	Canmar COURAGE	1457-21	198-00	CAST Terminal	CPS Logistics	Transgal	00/12/21	●	Lacolle
☐	TEXU5200947	Canmar COURAGE	1457-21	198-00	CAST Terminal	CPS Logistics	Transgal	00/12/21	●	Inbound
☐	CAXU4747847	Canmar COURAGE	1457-21	198-00	CAST Terminal	CPS Logistics	Transgal	00/12/23	●	Lacolle

Figure 25 Bill of Lading

3.19.21 Screen: Trucking Company Download

Diagram reference number: 21

This screen allows Trucking Companies to download information into a file that can be used later for updating their dispatch systems. The download consists of information related to the Orders to Carrier created by a Freight Forwarder by assigning the Trucking Company corresponding to the user logged on. For more information, see section 3.13.

The only stakeholder allowed to access this screen is the Trucking Company. The screen is accessible through the side menu.

As no context is received for this screen, when it is accessed it displays no information. The user must key in the type of download wanted, the range of dates for which the download is required, and a filename to specify where to download the information.

When the user clicks on the Submit button, a download file is created according to the criteria keyed in on the screen by the user.

Context:

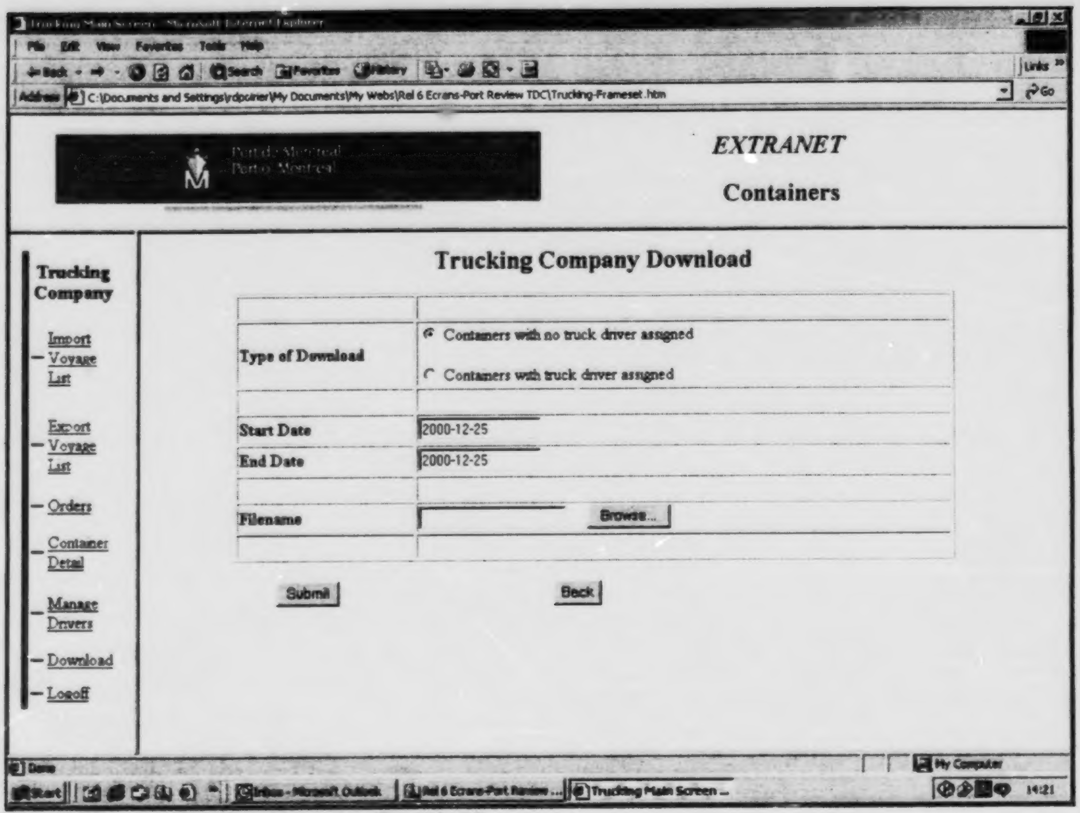
- Reached from the side menu and accessible only by Trucking Company users. No context is received.

Fields:

- **Type of Download:** a choice of two radio button fields to select the type of download to be made;
- **Start Date:** start date for the extraction of the download corresponding to an Order completion date. To facilitate the selection, a calendar will pop up for the user to select the date;
- **End Date:** end date for the extraction of the download corresponding to an Order completion date. To facilitate the selction, a calendar will pop up for the user to select the date;
- **Filename:** filename under which the download will be saved.

Buttons:

- **Browse:** related to the filename, allows the user to specify a filename using standard navigation;
- **Submit:** performs the download as specified in the screen by the user;
- **Back**: takes the user back to the previous screen.


File
Edit
View
Favorites
Tools
Help
Back
Search
Favorites
History
Links
Address
Go
Port de Montréal
Port of Montreal
Trucking Company
Import Voyage List
Export Voyage List
Orders
Container Detail
Manage Drivers
Download
Logoff
Browse...
Submit
Back
Done
My Computer
Start
Inbox - Microsoft Outlook
Rel 6 Ecrans-Port Review ...
Trucking Main Screen ...
14:21

Address: C:\Documents and Settings\dpoirier\My Documents\My Webs\Rel 6 Ecrans-Port Review TDC\Trucking-Frameset.htm

EXTRANET

Containers

Trucking Company Download

Type of Download	● Containers with no truck driver assigned ○ Containers with truck driver assigned
Start Date	2000-12-25
End Date	2000-12-25
Filename	

Figure 26 Trucking Company Download

3.20 Data Element Descriptions

Each data element that may appear on an Extranet application screen is described in this section to provide a brief reference for each screen, transaction, and database table.

User ID

Field description	User ID attributed to a user. Grants access to Extranet screens and allows the sending of transactions.
Appears on screen	Must be entered in the NT Logon Screen.
Can be modified on screen	N/A
Received in transactions	N/A
Database designation	Kept in LDAP.
Stakeholder responsible for entering the value	Provided to each user by Extranet administrative staff.
Users permitted to view the field	None.
Security requirements (e.g., encryption)	No special requirements.

Table 13 User ID

Password

Field description	Password attributed to a user. Grants access to Extranet screens and allows the sending of transactions.
Appears on screen	Must be entered in the NT Logon Screen.
Can be modified on screen	N/A
Received in transactions	N/A
Database designation	Kept in LDAP.
Stakeholder responsible for entering the value	Individual users are responsible for entering their own password.
Users permitted to view the field	None.
Security requirements (e.g., encryption)	Must always be encrypted.

Table 14 Password

Vessel name

Field description	Name of the vessel, which, along with the Voyage number, provides a unique identification for a Voyage.
Appears on screens	Import Voyage list, Export Voyage list, Import Containers list, Export Container list, Empty Memo list, Container Detail, and Manage Empty Memo.
Can be modified on screens	N/A
Received in transactions	Voyage Description (import and export).
Database designation	Data element: vyge vessel id in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.

Security requirements (e.g., encryption)	No special requirements.

Table 15 Vessel name

Voyage Number

Field description	Number of the Voyage, which, along with the Vessel name, provides a unique identification for a Voyage.
Appears on screens	Import Voyage list, Export Voyage list, Import Container list, Export Container list, Empty Memo list, Container Detail, and Manage Empty Memo.
Can be modified on screens	N/A
Received in transactions	Voyage Description (import and export).
Database designation	Data element: Vyge nbr in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 16 Voyage Number

Berth

Field description	Description of the Berth where the ship was, is, or will be in the Port of Montreal.
Appears on screens	Import Voyage list and Export Voyage list.
Can be modified on screens	N/A
Received in transactions	Voyage Description (import and export).
Database designation	Data element: vyge ship berth in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 17 Berth

Shipping Line

Field description	Name of the Shipping Line responsible for a Voyage.
Appears on screens…	Import Voyage list, Export Voyage list, Manage Empty Memo, and Shipping Line Detail.
Can be modified on screens	N/A
Received in transactions	Voyage Description (import and export).
Database designation	Data element: synm expression in Name Synonym Table. With port id + actr id, a match can be done in Actor Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or aContainer on the Voyage.

Security requirements (e.g., encryption)	No special requirements.

Table 18 Shipping Line

Estimated Time of Arrival (ETA)

Field description	Estimated time of arrival for an import Voyage.
Appears on screens	Import Voyage list.
Can be modified on screens	N/A
Received in transactions	Voyage Description (import).
Database designation	Data element: vyge actlexcptd dttm in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 19 Estimated Time of Arrival (ETA)

Estimated Time of Departure (ETD)

Field description	Estimated time of departure for an export Voyage.
Appears on screens	Export Voyage list and Empty Memo list.
Can be modified on screens	N/A
Received in transactions	Voyage Description (export).
Database designation	Data element: vyge actlexcptd dttm in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 20 Estimated Time of Departure (ETD)

Number of Containers

Field description	Number of Containers on a Voyage. Data is related to the context and the user logged on. For the same Voyage, the number of Containers displayed will not be the same for the Terminal user as for the Freight Forwarder user.
Appears on screens	Import Voyage list, Export Voyage list, Empty Memo list, and Manage Empty Memo.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	N/A
Stakeholder responsible for entering the value	Shipping Line is responsible for sending information about each Container. The system counts each Container related to a Voyage, so the number must be exact.
Users permitted to view the field	Every user related to the Voyage or a Container on the Voyage.

Security requirements (e.g., encryption)	No special requirements.

Table 21 Number of Containers

Bill of Lading

Field description	Bill of Lading number, which represents one or more Containers under the responsibility of a Freight Forwarder and related to a specific Voyage.
Appears on screens	Import Container list, Export Container list, Empty Memo list, and Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: bldng nbr in Bill of Lading Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Bill of Lading or a Container on the Bill of Lading.
Security requirements (e.g., encryption)	No special requirements.

Table 22 Bill of Lading

Container Number

Field description	Unique identification of a Container.
Appears on screens	Import Container list, Export Container list, Container Detail, and Container Log.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit init id + Unit nbr id in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 23 Container Number

Freight Forwarder

Field description	Name of the Freight Forwarder.
Appears on screens	Import Container list, Export Container list, Empty Memo list, Container Detail, and Freight Forwarder Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: synm expression in Name Synonym Table. With port id + actr id, a match can be done in Actor Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Bill of Lading or a Container on the Bill of Lading.

Security requirements (e.g., encryption)	No special requirements.

Table 24 Freight Forwarder

Terminal

Field description	Name of the Terminal.
Appears on screens	Import Container list, Export Container list, Empty Memo list, Container Detail, Manage Empty Memo, and Terminal Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: synm expression in Name Synonym Table. With port id + actr id, a match can be done in Actor Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to the Bill of Lading or a Container on the Bill of Lading.
Security requirements (e.g., encryption)	No special requirements.

Table 25 Terminal

Trucking Company

Field description	Name of the Trucking Company (assigned to a Container or a booking).
Appears on screens	Import Container list, Export Container list, Empty Memo list, Container Detail, Manage Empty Memo, and Trucking Company Detail.
Can be modified on screens	• Container Detail: by the Freight Forwarder to assign the Trucking Company to a specific Container • Booking Management: by the Freight Forwarder to assign a Trucking Company to a specific booking
Received in transactions	• Trucking Company Assignment • Booking
Database designation	Data element: synm expression Name Synonym Table. With port id + actr id, a match can be done in Actor Table.
Stakeholder responsible for entering the value	Freight Forwarder is responsible for assigning a Trucking Company to a Container.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 26 Trucking Company

Pickup Date

Field description	Date on which the import Container must be picked up at the Port of Montreal.
Appears on screens	Import Container list and Container Detail.
Can be modified on screens	• Container Detail: by the Freight Forwarder when assigning the Trucking Company

Received in transactions	Trucking Company Assignment (import).
Database designation	Data element: ordr expected achie dt in Order to Carrier Table.
Stakeholder responsible for entering the value	Freight Forwarder.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 27 Pickup Date

Delivery Date

Field description	Date on which the export Container must be delivered to the Port of Montreal.
Appears on screens	Export Container list and Container Detail.
Can be modified on screens	• Container Detail: by the Freight Forwarder when assigning the Trucking Company
Received in transactions	Trucking Company Assignment (export).
Database designation	Data element: ordr expected achie dt in Order to Carrier Table.
Stakeholder responsible for entering the value	Freight Forwarder.
Users permitted to view the field	Every user related to the Containers on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 28 Delivery Date

Status

Field description	Colour coded status of the Container. Green means ready to be handled and Red means not ready to be handled. Status is system-generated from other status and release fields (see Container Detail).
Appears on screens	Import Container list and Export Container list.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	N/A
Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 29 Status

Customs Location

Field description	Customs location for an import Container (may be designated as Inbound).
Appears on screen	Import Container list.
Can be modified on screens	N/A

Received in transactions	Bill of Lading (import).
Database designation	Data element: Unit Custom check locn in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 30 Customs Location

Truck Driver Assignment

Field description	Name of the Truck Driver of a specific Trucking Company.
Appears on screens	Container Detail, Truck Driver Assignment Detail, and Manage Drivers.
Can be modified on screens	• Truck Driver Assignment: the Trucking Company may assign an existing Truck Driver to a Container • Manage Drivers: the Trucking Company may add, modify, or delete a Truck Driver within a Trucking Company
Received in transactions	Truck Driver assignment (import and export).
Database designation	Data element: drvr name in Truck Driver Table.
Stakeholder responsible for entering the value	Trucking Company.
Users permitted to view the field	Every user related to aContainer on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 31 Truck Driver Assignment

Storage Date

Field description	Date after which the Trucking Company will be charged if the import Container is not picked up from the Terminal. Date is system-generated based on the ETA and rules specific to each Terminal.
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import).
Database designation	Data element: unit storage dt in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 32 Storage Date

Cutoff Time

Field description	Date before which the Trucking Company must deliver the Container related to a specific Voyage. Date is system-generated based on the ETD and rules specific to each Shipping Line.

Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (export).
Database designation	Data element: unit cutoff dt in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 33 Cutoff Time

Movement

Field description	Type of movement related to a specific Container on a specific Voyage (import or export).
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: vyge impexp cd in Voyage Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 34 Movement

Global Status

Field description	Global Status of a specific Container on a specific Voyage: Values for Import: • Grounded • Gate Out Values for Export: • Gate In • On Ship
Appears on screen	Container Detail.
Can be modified on screens	• Container Detail: by Terminal users
Received in transactions	Container Status Change.
Database designation	Data elements (in Unit Summary Table): • Unit gate in cd • Unit gate out cd • Unit grnd cd • Unit on ship cd
Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 35 Global Status

Customs Release

Field description	Customs release of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	• Container Detail: by Terminal users
Received in transactions	Container Status Change.
Database designation	Data element: unit rlcc cd in Unit Summary Table.
Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 36 Customs Release

Agriculture Release

Field description	Agriculture release of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	• Container Detail: by Terminal users
Received in transactions	Container Status Change.
Database designation	
Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 37 Agriculture Release

Shipping Line Release

Field description	Shipping Line release of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	• Container Detail: by Terminal users
Received in transactions	Container Status Change.
Database designation	Data element: unit rlsl cd in Unit Summary Table.
Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 38 Shipping Line Release

Terminal Release

Field description	Terminal release of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	• Container Detail: by Terminal users
Received in transactions	Container Status Change.
Database designation	Data element: unit rlte cd in Unit Summary Table.

Stakeholder responsible for entering the value	Terminal.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 39 Terminal Release

Full/Empty

Field description	Full or Empty indicator for a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit LoadEmpty cd in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 40 Full/Empty

Length

Field description	Length of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit length in Unit Summary Table. Combined with the unit of measure, data element: unit length units in Unit Summary Tablet.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 41 Length

Type

Field description	Type of Container (Regular, Reefer, Flat, Open Top, High Cube, etc.)
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit type in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.

Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 42 Type

Weight

Field description	Weight of a specific Container on a specific Voyage.
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit gross weight in Unit Summary Table. Combined with the unit of measure, data element: unit weight units in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 43 Weight

Dangerous Warning

Field description	Dangerous warning for the contents of theContainer. It is combined with the class and UN number.
Appears on screen	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit danger class cd in Unit Summary Table. Combined with UN number, data element: unit danger UN cd in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every user related to a Container on the Voyage.
Security requirements (e.g., encryption)	No special requirements.

Table 44 Dangerous Warning

Content

Field description	Contents of the Container.
Appears on screens	Container Detail.
Can be modified on screens	N/A
Received in transactions	Bill of Lading (import and export).
Database designation	Data element: unit content in Unit Summary Table.
Stakeholder responsible for entering the value	Shipping Line.
Users permitted to view the field	Every Trucking Company, Freight Forwarder, and Shipping Line user related to a Container on the Voyage.

Security requirements (e.g., encryption)	Terminal users will not be able to see the value of the field.

Table 45 Content

Booking Number

Field description	Booking number.
Appears on screens	Empty Memo list and Manage Empty Memo.
Can be modified on screens	• Manage Empty Memo: by the Freight Forwarder to create a new booking
Received in transactions	Manage Empty Memo.
Database designation	Data element: bkng nbr in Booking Table.
Stakeholder responsible for entering the value	Freight Forwarder is responsible for providing a valid booking number to the Extranet as given by the Shipping Line.
Users permitted to view the field	Every user related to a Container on the booking.
Security requirements (e.g., encryption)	No special requirements.

Table 46 Booking Number

Empty Memo Instructions

Field description	Empty Memo Instructions as given by the Freight Forwarder to a Trucking Company.
Appears on screens	Empty Memo list and Manage Empty Memo.
Can be modified on screens	• Manage Empty Memo: by the Freight Forwarder to specify a booking number when creating or modifying an Empty Memo
Received in transactions	Manage Empty Memo.
Database designation	Data element: freeordr booking nbr in Order to Carrier Table.
Stakeholder responsible for entering the value	Freight Forwarder is responsible for providing the Extranet with the Empty Memo Instructions intended for a Trucking Company.
Users permitted to view the field	Every user related to a Container on the booking.
Security requirements (e.g., encryption)	No special requirements.

Table 47 Empty Memo Instructions

General Telephone

Field description	General telephone number of a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: actr gen phone nbr in Actor Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 48 General Telephone

Address

Field description	General address of a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: actr gen address in Actor Table.
Stakeholder responsible for entering the value	Specific stekeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 49 Address

Web Site

Field description	Web site address of a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: actr web site in Actor Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 50 Web Site

Contact

Field description	Name of a contact person for a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct name in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements

Table 51 Contact

Telephone

Field description	Telephone number of the contact person for a partner in the Extranet.

Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct phone nbr in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 52 Telephone

E-mail

Field description	E-mail address for a contact person for a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct e-mail in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 53 E-mail

Title

Field description	Position of the contact person within a partner company in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct function in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 54 Title

Fax

Field description	Fax number of the contact person for a partner in the Extranet.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.

Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct fax nbr in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 55 Fax

City

Field description	City where the contact person for a partner in the Extranet is located.
Appears on screens	Shipping Line Detail, Terminal Detail, Freight Forwarder Detail, and Trucking Company Detail.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data element: cntct city in Contact Person Table.
Stakeholder responsible for entering the value	Specific stakeholder when becoming an Extranet partner or when information changes.
Users permitted to view the field	Every user related to a Container associated with the specific partner.
Security requirements (e.g., encryption)	No special requirements.

Table 56 City

Truck Driver's Name

Field description	Name of a Truck Driver employed by a Trucking Company.
Appears on screens	Container Detail, Truck Driver Assignment Detail, and Manage Drivers.
Can be modified on screens	• Truck Driver Assignment Detail: by the Trucking Company to assign a Truck Driver to a Container • Manage Drivers: by the Trucking Company to add, modify, or delete Truck Drivers within the Company
Received in transactions	Truck Driver Assignment.
Database designation	Data element: drvr name in Truck Driver Table.
Stakeholder responsible for entering the value	Trucking Company.
Users permitted to view the field	Every user related to a Container to which the Truck Driver is assigned.
Security requirements (e.g., encryption)	No special requirements.

Table 57 Truck Driver's Name

Employee Number

Field description	Employee number of a Truck Driver employed by a Trucking Company.

Appears on screens	Truck Driver Assignment Detail and Manage Drivers.
Can be modified on screens	• Manage Drivers: by the Trucking Company to add, modify, or delete Truck Drivers within the Company
Received in transactions	Truck Driver Assignment.
Database designation	Data element: drvr employee id in Truck Driver Table.
Stakeholder responsible for entering the value	Trucking Company.
Users permitted to view the field	Every user related to a Container to which the Truck Driver is assigned.
Security requirements (e.g., encryption)	No special requirements.

Table 58 Employee Number

Truck Number

Field description	Number of the Truck used by a Truck Driver for a specific assignment.
Appears on screens	Truck Driver Assignment Detail.
Can be modified on screens	• Truck Driver Assignment Detail: by the Trucking Company to assign a Truck to a Container
Received in transactions	Truck Driver Assignment.
Database designation	Data element: instr truck assigned in Instruction to Truck Driver Table.
Stakeholder responsible for entering the value	Trucking Company must provide a truck number when it assigns a Truck Driver to a Container.
Users permitted to view the field	All users related to a Container to which the Truck Driver is assigned.
Security requirements (e.g., encryption)	No special requirements.

Table 59 Truck Number

Truck Driver Assignment Comments

Field description	Comments about the assignment of a Truck Driver to a Container.
Appears on screens	Truck Driver Assignment Detail.
Can be modified on screens	• Truck Driver Assignment Detail: by the Trucking Company to assign a Truck Driver to a Container
Received in transactions	Truck Driver Assignment.
Database designation	Data element: instr note in Instruction to Truck Driver Table.
Stakeholder responsible for entering the value	Trucking Company.
Users permitted to view the field	Every user related to a Container to which the Truck Driver is assigned.
Security requirements (e.g., encryption)	No special requirements.

Table 60 Truck Driver Assignment Comments

Trucking Company Instructions

Field description	Trucking Company instructions given by the Freight Forwarder to the Trucking Company.

Appears on screens	Trucking Company Assignment.
Can be modified on screens	• Trucking Company Assignment Detail: by the Freight Forwarder to assign a Trucking Company to a specific Container
Received in transactions	Trucking Company Assignment.
Database designation	Data element: ordr note in Order to Carrier Table.
Stakeholder responsible for entering the value	Freight Forwarder, when assigning a Trucking Company assignment to a Container.
Users permitted to view the field	Every user related to a Container's instruction.
Security requirements (e.g., encryption)	No special requirements.

Table 61 Trucking Company Instructions

Container Log

Field description	Description of events related to a Container.
Appears on screens	Container log.
Can be modified on screens	N/A
Received in transactions	N/A
Database designation	Data elements: in Actual Event Table.
Stakeholder responsible for entering the value	Internal to the system.
Users permitted to view the field	Every user related to a Container.
Security requirements (e.g., encryption)	No special requirements.

Table 62 Container Log

3.21 Alternate Solution for Export Containers

For the stakeholder involved, the Export Container process is simpler than the import process. There is less information to share and fewer steps required. From a systems point of view, the export process is trickier because of the timing: information must be available very quickly, otherwise it is useless.

The key, in the export process, is to have information available when the Truck Driver reaches the Terminal gate with a Container to deliver for export. At that moment, the Extranet must provide at least the following information:

- Container number expected for an export Voyage;
- Identification of the export Voyage (Vessel name + Voyage number);
- Bill of Lading number of the Container (it may or may not correspond to the Booking number. There is no formal rule so no validation can be made);
- Trucking Company assigned to the Container;
- Identification of the Truck Driver assigned to the Container.

The availability of this information will increase the efficiency of accessing the terminal through a gate.

The current Export process (without the Extranet) proceeds as follows:

- The Freight Forwarder and the Shipping Line agree on spaces for Containers on an export Voyage. This may happen several days before the Voyage.
- The Shipping Line provides a Voyage Description (Manifest Summary). This may happen several days before the voyage.
- The Freight Forwarder may hires a Trucking Company to pick up empty Container(s).
- The Freight Forwarder hires a Trucking Company to deliver export Container(s) to the Port of Montreal.
- The Trucking Company delivers the Container(s) to the Port of Montreal.
- The Freight Forwarder gathers Container information provided by the Trucking Company and sends it to the Shipping Line. The Shipping Line is responsible for compiling the complete manifest (with Container information) for the Voyage. The manifest should be available a few days before the Voyage reaches its destination. At that moment, the ship may have departed from the Port of Montreal.

Note: Steps 3, 4, and 5 may happen just a few hours before the ship leaves the Port of Montreal. Container numbers are not known before the Truck Driver gets the container.

The major difficulty lies in deciding who should provide Container information to the Extranet. There are two solutions:

1. Shipping Lines could provide all information on export Containers as they do in the import process. This is the solution described throughout the design document.

Advantages:

- Theorically, this is the best solution because the design is the same as in the import process.
- Shipping Lines have the resources to send batch transactions (they already send similar EDI transactions).
- More information related to the Container will be available (all the characteristics of the Container).

Disadvantage:

- The information may arrive too late in the Extranet (after the ship has left the Port of Montreal).

2. Trucking Companies or Freight Forwarders could provide information on export Containers only. This is the solution presented in this section.

Advantages:

- The stakeholder will be able to provide the Extranet with information on time.
- There is more flexibility in how the information can be provided: by one of two stakeholders and through batch transactions or on-line screens.

Disadvantages:

- Container information will be minimal (no characteristics will likely be provided).
- Some of the stakeholders may not have sufficient resources to send batch transactions; information will therefore have to be keyed in on-screen.

Recommended Solution: Trucking Companies or Freight Forwarders should provide export Container information. We cannot risk receiving information too late in the process.
If the current situation improves before the implementation phase of the Extranet, and Shipping Lines are able provide information faster, the recommendation would revert back to the initial design.

Important: Having two kinds of stakeholders (Trucking Companies and Freight Forwarders) responsible for providing export Container information may be a more flexible solution, but it may also be a source of confusion. For that reason, it is recommended that Trucking Companies be responsible for providing information on export Containers. Freight Forwarders will be able to provide the information for exceptional reasons.

To implement the recommended solution, a few changes would be required to the application.

- The Bill of Lading batch transaction allows the Shipping Line to provide information on Export Containers. That transaction should be split into two distinct transactions. The first one, the Bill of Lading as it is defined currently, should be used for import Voyages only and be provided by the Shipping Lines as defined. The other, the newly defined Export Bill of Lading, will be used for export Voyages only. Freight Forwarders and Trucking Companies will be authorized to send that transaction to the Extranet. The format of the Export Bill of Lading would be very similar to the import Bill of Lading.
- Unlike Shipping Lines, some Trucking Companies or Freight Forwarders do not have the resources necessary to send batch transactions. For that reason, one new screen would be defined to provide an alternative way for stakeholders to send information on export Containers.
- In the initial design, several fields related to containers are defined as mandatory. Trucking Companies or Freight Forwarders may not have the required information or may not want to spend time entering all the information. Some fields that are mandatory for the import process should be optional for the export process. For more details, see the Export Bill of Lading transaction format with new definitions.
- The Assign Trucking Company to Container step is not required in the export process. The Export Bill of Lading transactions (or the on-line screen) should indicate the name of the Trucking Company, but the rest of the information on an Order (e.g., instructions and date to deliver) is unnecessary because most of the time, Trucking Companies will be providing the information. The objective of an Order is to provide information to Trucking Companies.

With the recommended solution, the following must be implemented as defined in the Application section for Export containers:

- The Shipping Line must provide the manifest summary for export Voyages with the batch transaction: Voyage Description. This must be done at least a few days before the ship's departure from the Port of Montreal.
- If necessary, instructions to handle pickup of empty containers must be defined by the Freight Forwarder with Empty Memos.
- Trucking Companies must assign Truck Drivers to Containers.
- The Terminal must provide required status changes (In Gate and On Ship) for export Containers.

3.21.1 Alternate Export Flow

Modifications are presented in italics.

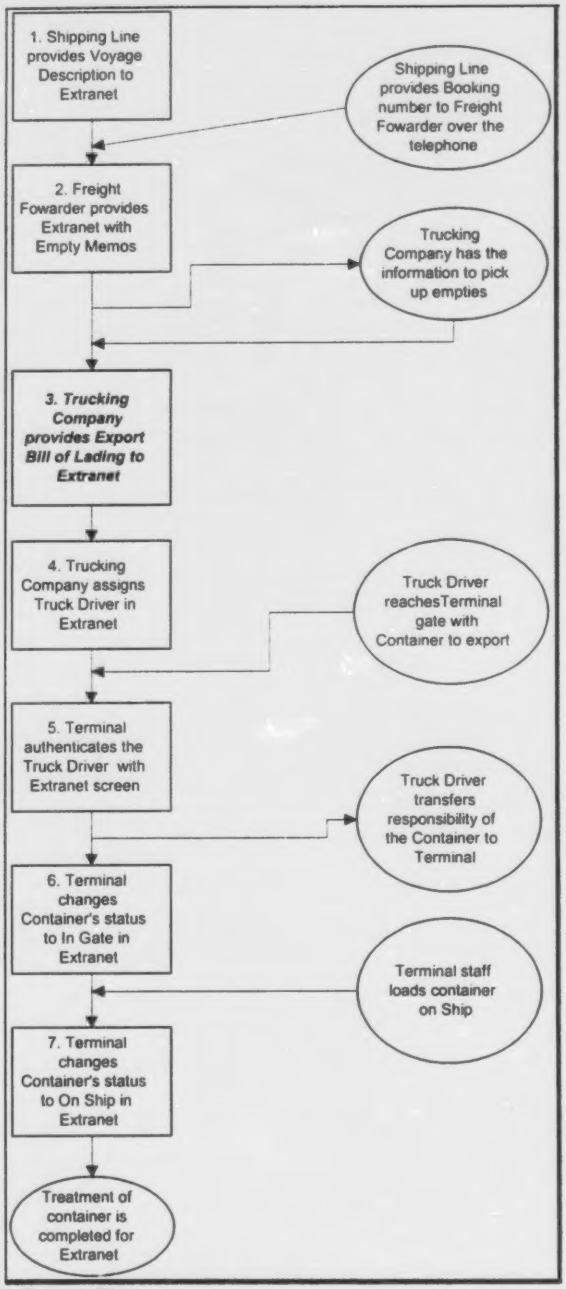

1. Shipping Line provides Voyage Description to Extranet
Shipping Line provides Booking number to Freight Fowarder over the telephone
2. Freight Fowarder provides Extranet with Empty Memos
Trucking Company has the information to pick up empties
3. Trucking Company provides Export Bill of Lading to Extranet
4. Trucking Company assigns Truck Driver in Extranet
Truck Driver reachesTerminal gate with Container to export
5. Terminal authenticates the Truck Driver with Extranet screen
Truck Driver transfers responsibility of the Container to Terminal
6. Terminal changes Container's status to In Gate in Extranet
Terminal staff loads container on Ship
7. Terminal changes Container's status to On Ship in Extranet
Treatment of container is completed for Extranet

Figure 27 Alternate Export Flow

3.21.2 Provide Export Bill of Lading with Batch Transaction

FR-21-1	**Functional Requirement Name:** Provide Export Bill of Lading with Batch Transaction
Functional Focus:	**Priority:** High

Functional Requirement Definition: Receives Export Bill of Lading transaction, validates it, updates Extranet database, and sends an acknowledgement to the sender (Trucking Company or Freight Forwarder).

INTRODUCTION:
See section 3.21.

INPUT:
Transaction sent by the Trucking Company or Freight Forwarder and reformatted by the translator. See Transaction: Export Bill of Lading format.

PROCESSING:

1. Create a new Export Bill of Lading:

Validation rules:

- The related Freight Forwarder must exist in the Extranet;
- The related Voyage (Vessel name + Voyage number) must exist in the Extranet and it must be an export Voyage;
- A Bill of Lading must not exist for that specific Voyage (Vessel name + Voyage number + Bill of Lading number);
- The Trucking Company must exist in the Extranet.

Impact of the creation:

- The Bill of Lading and information about its Container(s) are now available to display on the various screens for related stakeholders (see section 3.21);
- Related Terminal may provide status or releases in the Extranet for Containers included in the Bill of Lading;
- Related Trucking Company is now able to assign Truck Drivers to the Containers included in the Bill of Lading.

Database modifications:

- Creates entries for the Bill of Lading in the Bill of Lading and Unit Summary tables;
- Creates an order internally with minimal information.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 701: Transaction rejected, export Voyage does not exist;
- Reason code = 702: Transaction rejected, Bill of Lading number already exists for that export Voyage;
- Reason code = 703: Transaction rejected, Freight Forwarder does not exist;
- Reason code = 704: Transaction rejected, Trucking Company does not exist.

2.1 Modify general information of the Export Bill of Lading:

Validation rules:

- The Bill of Lading must exist for the related Voyage (Vessel name + Voyage number + Export Bill of Lading number);
- If the Freight Forwarder is changed, the new Freight Forwarder must exist in the Extranet;

FR-21-1	**Functional Requirement Name:** Provide Export Bill of Lading with Batch Transaction	
Functional Focus:		**Priority:** High

- The stakeholder sending the transaction must be the same as the one that created the Export Bill of Lading.

Impact of modifying the Freight Forwarder:

- The information changes are reflected on various screens for related stakeholders;
- Sends an alert to the previous Freight Forwarder;
- If Orders (Trucking Companies assigned) exist for the related Bill of Lading, they are removed;
- If Instructions (Truck Driver assigned) exist for the related Bill of Lading, they are removed;
- If Orders are removed, alerts are sent to related Trucking Companies.

Database modifications:

- Updates related entry in the Bill of Lading (vyge vessel id + vyge nbr + bldng nbr) table with the name of the new Freight Forwarder (ff actr id);
- If relevant, deletes any related entries in the Order to Carrier and Standard Suborder tables (for vyge vessel id + vyge nbr + bldng nbr);
- If relevant to the deleted Orders, deletes related entries in Instruction to Truck Driver and Standard Subinstruction tables (for ordr id + stdsubord line nbr deleted).

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 703: Transaction rejected, Freight Forwarder does not exist;
- Reason code = 706: Transaction rejected, Stakeholder sending the transaction is not the same as the one that created of the Bill of Lading;
- Reason code = 705: Transaction rejected, Bill of Lading does not exist.

2.2 Add Containers to the Export Bill of Lading

Supplementary Validation rules:

- The Container added must not exist on that particular Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Impact of adding a Container to a Bill of Lading:

- The Container is displayed on the various screens for related stakeholders;
- Related Terminal may provide status or releases for the new Container;
- Related Trucking Company is now able to assign Truck Driver to the new Container.

Database modifications:

- Creates entry in Unit Summary tables in relation with the proper Bill of Lading (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id).

Other possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 707: Transaction applied except Add Container # xxxyyyy, which already exists. A modified Bill of Lading transaction with a modified Container sub-transaction can be sent later.

FR-21-1	**Functional Requirement Name:** Provide Export Bill of Lading with Batch Transaction
Functional Focus:	**Priority:** High

2.3 Modify Container information on the Export Bill of Lading

Supplementary validation rules:

- The Container modified must exist in the Extranet for the same Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Database modifications:

- Updates related entry in Unit Summary table (vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id).

Impact of modifying information on a specific Container:

- Changes are reflected on various screens.

Supplementary possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 708: Transaction applied except Modify Container # xxxyyyy, which does not exist.

2.4 Delete Containers from the Export Bill of Lading

Supplementary validation rules:

- The Container deleted must exist in the Extranet for the same Bill of Lading (Vessel name + Voyage number + Bill of Lading number + Container number).

Impact of deleting a Container from the Export Bill of Lading:

- The Container disappears from related screen;
- If an Order exists, it is deleted;
- If an Instruction exits, it is removed;
- The Container is deleted with all related events;
- Sends an alert to the related Freight Forwarder (if the transaction is made by the Trucking Company);
- Sends an alert to the related Trucking Company (if the transaction is made by the Freight Forwarder);

Database modifications:

- Deletes related entries (key vyge vessel id + vyge nbr + bldng nbr + unit init id + unit nbr id) in Unit Summary, Actual Event, Order to Carrier, Standard Suborder, Instruction to Truck Driver, and Standard Subinstruction tables.

Possible responses to the transaction (Acknowledgement):

In a Bill of Lading transaction, the Extranet may reject a sub-transaction corresponding to a specific Container, while accepting the rest of the transaction. When this occurs, an error message is sent with the corresponding Container number. It is possible, if more than one sub-transaction is rejected, to send more than one acknowledgement for a single Bill of Lading transaction.

- Reason code = 708: Transaction applied except Cancel Container # xxxyyyy, which does not exist.

FR-21-1	**Functional Requirement Name:** Provide Export Bill of Lading with Batch Transaction

Functional Focus:	**Priority:** High

3. Cancel an Export Bill of Lading:

Validation rules:

- The Bill of Lading must exist in the Extranet (Vessel name + Voyage number + Bill of Lading number);
- The stakeholder sending the transaction must be the same as the one that created the Export Bill of Lading.

Impact of the cancellation:

- The Bill of Lading and the information about its Container disappear from the various screens for related stakeholders;
- Sends an alert to the Freight Forwarder related to the Bill of Lading (if the transaction is sent by the Trucking Company);
- Sends an alert to the Trucking Company related to the Bill of Lading (if the transaction is sent by the Freight Forwarder).

Database modifications:

- Deletes the entry in the Bill of Lading table (key vyge vessel id + vyge nbr + bldng nbr);
- For each Container in the Bill of Lading, deletes related entries (key vyge vessel id + vyge nbr + bldng nbr + unit init id +unit nbr id) in Unit Summary, Actual Event, Order to Carrier, Standard Suborder, Instruction to Truck Driver, and Standard Subinstructions.

Possible responses to the transaction (Acknowledgement):

- Reason code = 000: OK, transaction processed successfully;
- Reason code = 706: Transaction rejected, Stakeholder sending the transaction is not the same as the one that created of the Bill of Lading;
- Reason code = 705: Transaction rejected, Bill of Lading does not exist.

4. Additional validations:

Here are additional validations not related to one specific transaction type.

Validation rules:

- The Transaction ID must be 'EB' for Export Bill of Lading;
- The transaction type must be 'A' for Add, 'M' for Modify, or 'C' for Cancel.

Possible responses to the transaction (Acknowledgement):

- Reason code = 901: Transaction rejected, invalid transaction ID;
- Reason code = 902: Transaction rejected, invalid transaction type.

OUTPUT:

- Updates Extranet database for Export Bill of Lading transaction, if it is valid;
- Sends an acknowledgement to the stakeholder (Freight Forwarder or Trucking Company).

Transaction: Export Bill of Lading format:

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Transact ID	Identification of transaction	Mandatory	Alphabetic	2	'EB'	N/A
Transaction Type	Type of transaction	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A
ReferenceNo	Number generated by stakeholder, sent back in acknowledgement by Extranet	Mandatory	Numeric	10		N/A
Tx Timestamp	Transaction timestamp, Montreal time zone	Mandatory	Timestamp	16	yyyymmddhhmmsscc	N/A
Stakeholder Identifier	Name of stakeholder sending the transaction (Freight Forwarder or Trucking Company)	Mandatory	Alphanum.	60		General name
System Version	Version of the application in case of changes in transaction format	Mandatory	Numeric	3	100 for version 1.00 at beginning	N/A
Vssl_id	Vessel identification (name)	Mandatory	Alphanum.	30		Vessel
Vyge_nbr	Voyage number	Mandatory	Alphabetic	15		Voyage
Bldng_nbr	Bill of Lading number	Mandatory	Alphanum.	20		Bill of Lading
Freight Forwarder name (1)	Freight Forwarder identification	Mandatory	Alphanum.	60		
Number of Containers	Number of Containers included in transaction	Mandatory	Numeric	3		N/A
For each Container (loop)						
Sub Transaction Type	Type of action to be done with Container	Mandatory	Alphabetic	1	'A' for Add 'M' for Modify 'C' for Cancel	N/A

Field	Description	Optional / Mandatory	Format	Length	Values	DB table
Unit_init_id and unit_nbr_id	Container number (unique identification)	Mandatory	Alphanum.	11		Unit summary
Unit_length	Length of Container	Optional	Numeric 8,4	12		Unit summary
Unit_length_units	Unit of measure for Container's length	Mandatory if unit_length is included	Numeric	1	1: metres 2: feet	Unit summary
Unit_type	Type of Container	Optional	Numeric	2	01: regular 02: open top 03: high cube 04: flat 05: reefer	Unit summary
Unit_loadempty_cd	Load or Empty indicator	Optional	Alphabetic	1	E: empty L: loaded U: unknown	Unit summary
Unit_weight	Gross weight	Optional	Numeric 8,4	12		Unit summary
Unit_weight_units	Unit of measure for Container's weight	Mandatory if unit_weight is included	Numeric	1	1: kilograms 2: metric tons 3: pounds 4: tons	Unit summary
Unit_content	Container's content	Optional	Alphanum.	40	To be confirmed	Unit summary
Unit_danger_class_cd	Dangerous class code	Optional	Numeric	2	00: if none 32: means 3.2.	Unit summary
Unit_danger_un_cd	Dangerous UN code	Mandatory if Class Code is included	Numeric	6		Unit summary
Unit_place_of_delivery	Container's place of delivery (final destination)	Optional	Alphanum.	40		Unit summary
Trucking Company Name (2)	Trucking Company identification	Mandatory	Alphanum.	60		

Table 63 Export Bill of Lading Format

(1): If the Freight Forwarder is sending the transaction, it will be the same value as the Stakeholder Identifier field.

(2): If the Trucking Company is sending the transaction, it will be the same value as the Stakeholder Identifier field.

3.21.3 Alternate Screens Flow

Modifications are presented in italics.

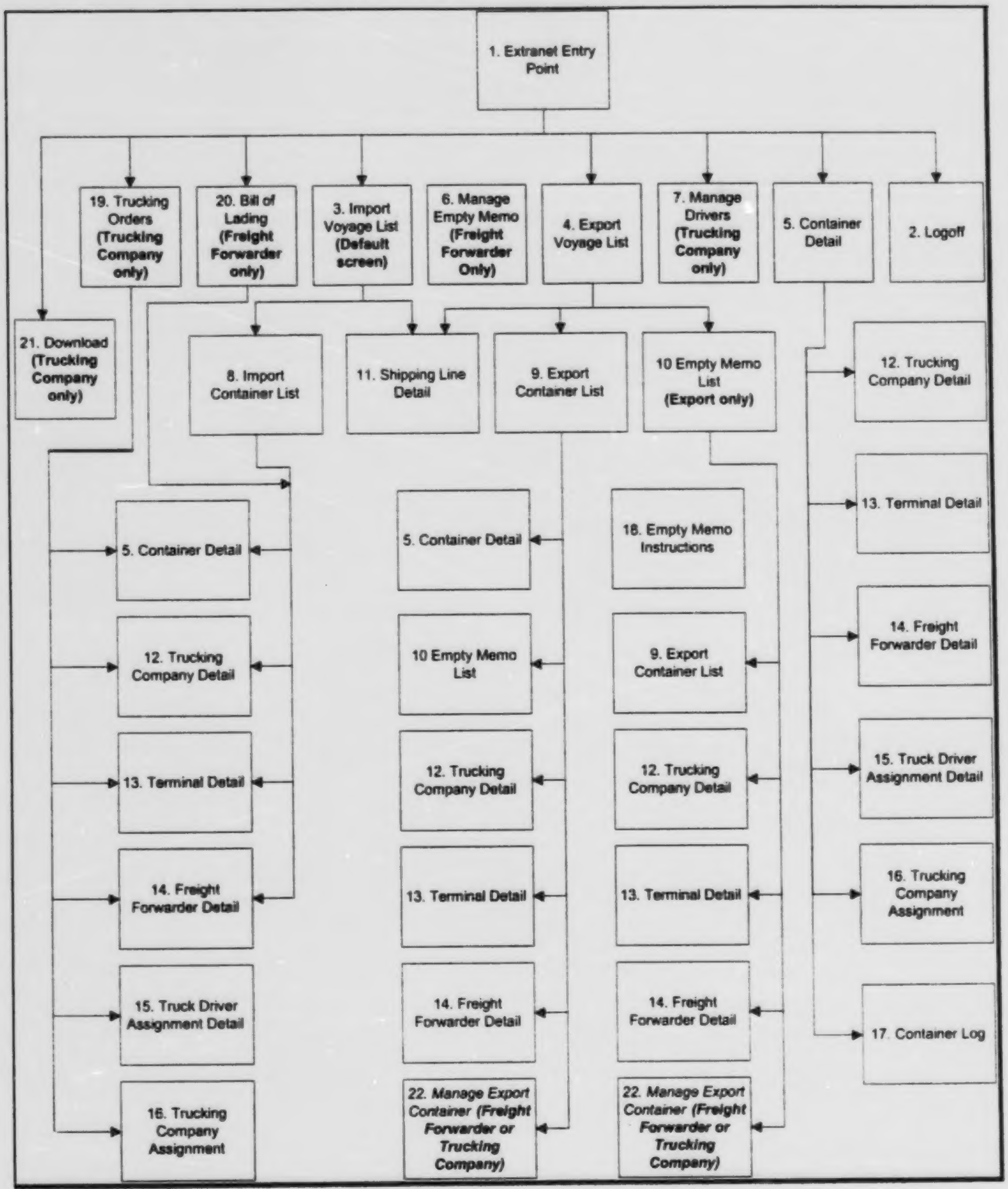

1. Extranet Entry Point
19. Trucking Orders (Trucking Company only)
20. Bill of Lading (Freight Forwarder only)
3. Import Voyage List (Default screen)
6. Manage Empty Memo (Freight Forwarder Only)
4. Export Voyage List
7. Manage Drivers (Trucking Company only)
5. Container Detail
2. Logoff
21. Download (Trucking Company only)
8. Import Container List
11. Shipping Line Detail
9. Export Container List
10 Empty Memo List (Export only)
12. Trucking Company Detail
13. Terminal Detail
14. Freight Forwarder Detail
15. Truck Driver Assignment Detail
16. Trucking Company Assignment
17. Container Log
5. Container Detail
12. Trucking Company Detail
13. Terminal Detail
14. Freight Forwarder Detail
15. Truck Driver Assignment Detail
16. Trucking Company Assignment
5. Container Detail
10 Empty Memo List
12. Trucking Company Detail
13. Terminal Detail
14. Freight Forwarder Detail
22. Manage Export Container (Freight Forwarder or Trucking Company)
18. Empty Memo Instructions
9. Export Container List
12. Trucking Company Detail
13. Terminal Detail
14. Freight Forwarder Detail
22. Manage Export Container (Freight Forwarder or Trucking Company)

Figure 28 Alternate Screens Flow

3.21.4 Screen: Manage Export Container Detail

Diagram reference number: 22

This screen allows users to add, modify, or delete containers for export Voyages. The objective is to define information related to a Container before the Truck Driver reaches the Terminal gate to deliver the Container.

Prior to this function, the related Export Voyage must be defined in the Extranet. The Shipping Line provides that information with the batch transaction: Voyage Description. Defining an export Container with this screen allows the Trucking Company to assign a Truck Driver before that Truck Driver reaches the gate with the Container. This function can be performed using the screen: Truck Driver Assignment Detail or with the batch transaction: Truck Driver Assignment.

Freight Forwarders and Trucking Companies are authorized to define export Containers in the Extranet. With two types of users allowed to define export Containers, the solution is more flexible and there are more ways to receive the information on time (i.e., before the Truck Driver reaches the gate).

An export Container can only be modified or deleted by the stakeholder who created it. For example, a Trucking Company related to an export Container cannot modify the container if the Freight Forwarder created it.

Containers can only be added for export. When adding a Container, the related Voyage must be specified. The Voyage is selected from an existing list (drop-down menu) that displays only export Voyages. The drop-down menu guarantees that no container can be defined for import.

This screen is accessed with no context, meaning that no Container number is received as a parameter. The screen is displayed with no information, and users either fill in all the fields and add a container, or initiate a search for an existing export Container to modify or delete it. If no Container matching the Container number is retrieved, a detailed message is displayed.

Context:

- Reached from the Export Container List or Empty Memo List screen. No Container is received as context. If users want to retrieve an existing Container, they must key in a Container number and perform a search.

Search criteria following a Container number search:

- Selects Container information corresponding to the Container number keyed in;
- The search only scans export Containers. If the same Container number exists for an import Voyage, it will not be retrieved;
- The Freight Forwarder logged on must be the one that created the Container;
- The Trucking Company logged on must be the one that created the Container;
- If the search turns up more than one Container, a pop-up list is displayed for the user (with Vessel name, Voyage date, and related Terminal) to select the desired Container.

Database elements used for the search:

- Field unit_init_id + unit_nbr_id in Unit Summary table for Container number.

Search Container: With the Container number, the user may search for information on a specific Container. If the Container exists and is related to the user logged on, the information is displayed:

- ***Container Number*:** field to key in a Container number;
- **Search button:** user clicks on this button to begin the search;

- **Message:** if the Container is not found, a detailed message is displayed.

Fields:

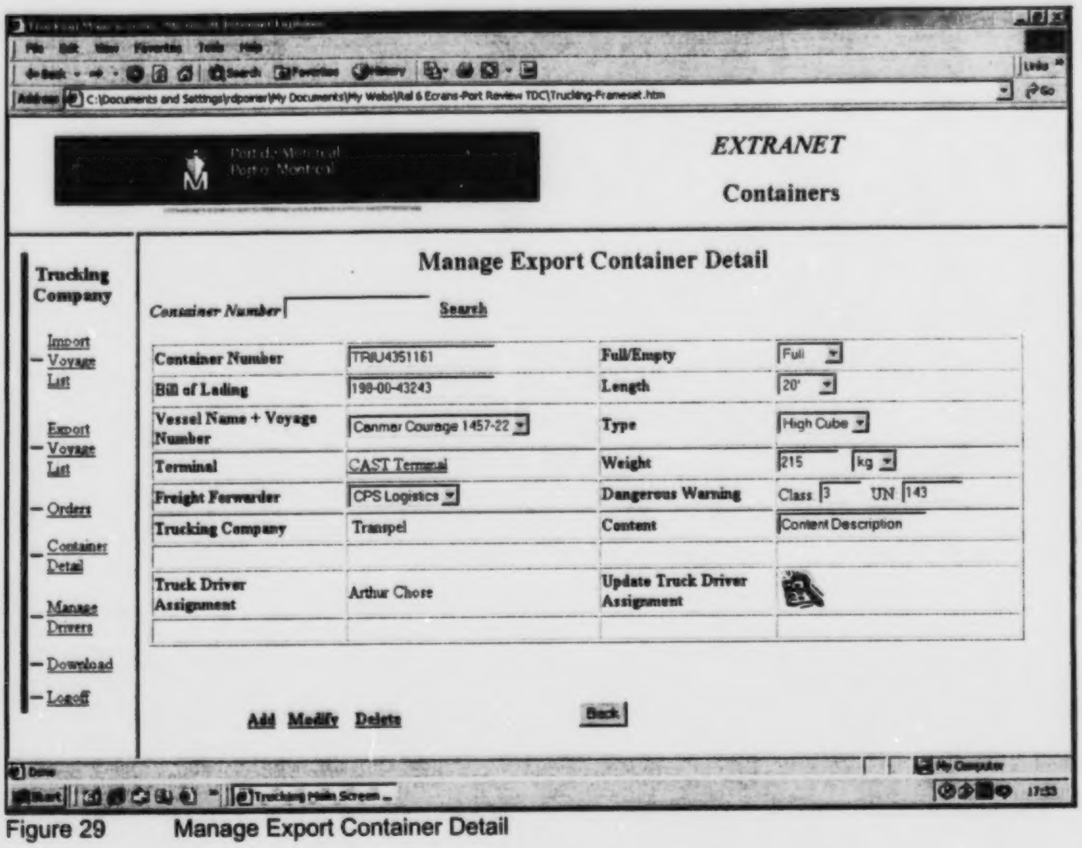
- **Container Number:** number of the Container. This field is mandatory;
- **Bill of Lading:** number of the Bill of Lading (booking number) related to the Container. This field is mandatory field;
- **Vessel name + Voyage Number:** Voyage number, which along with the Vessel name gives a unique identification for a Voyage, is specified by the user from a drop-down menu (mandatory field);
- **Terminal:** name of the Terminal responsible for handling the Container at the Port of Montreal. The field is display only; the system retrieves the value related to the Voyage specified by the user;
- **Freight Forwarder:** name of the Freight Forwarder related to the Container. This field is mandatory and must be specified by the user from a drop-down list. If the user logged on is a Freight Forwarder, the value is display only and corresponds to the user;
- **Trucking Company:** name of the Trucking Company related to the Container. This field is mandatory and must be specified by the user from a drop-down list. If the user logged on is a Trucking Company, the value is display only and corresponds to the user;
- **Truck Driver Assignment:** name of the Truck Driver assigned to the Container. This field is display only and contains a value only if the Trucking Company has made the Truck Driver assignment;
- **Full/Empty:** full or empty indicator. This field is optional. A drop-down list is available to specify the value;
- **Length:** length of the Container. This field is optional. A drop-down list is available to specify the value;
- **Type:** type of Container (Reefer, Regular, Flat, Open Top, High Cube, etc.). This field is optional. A drop-down list is available to specify the value;
- **Weight:** weight of the Container and the unit of measure. This field is optional. A drop-down list is available to specify the unit of measure;
- **Dangerous Warning:** class and UN number for the product. These fields are optional;
- **Content:** content of the Container. This free-form text field is optional.

Hyperlinks:

- **Freight Forwarder Field:** link to the Freight Forwarder Detail screen;
- **Terminal Field:** link to the Terminal Detail screen;
- **Update Truck Driver Assignment:** link to the Truck Driver Assignment screen, which allows the Trucking Company to specify the Truck Driver for the Container or to update the one already assigned.

Buttons:

- **Add:** adds the export Container. All mandatory fields must be filled;
- **Modify:** saves the changes made by the user on the export Container;
- **Delete:** deletes the export Container (specific to the Voyage);
- **Back**: takes the user back to the previous screen.


EXTRANET
Containers
Trucking Company
Import Voyage List
Export Voyage List
Orders
Container Detail
Manage Drivers
Download
Logoff
Search
Add
Modify
Delete
Back

Manage Export Container Detail

Container Number

Container Number	TRIU4351161	**Full/Empty**	Full
Bill of Lading	198-00-43243	**Length**	20'
Vessel Name + Voyage Number	Canmar Courage 1457-22	**Type**	High Cube
Terminal	CAST Terminal	**Weight**	215 kg
Freight Forwarder	CPS Logistics	**Dangerous Warning**	Class 3 UN 143
Trucking Company	Transpel	**Content**	Content Description
Truck Driver Assignment	Arthur Chose	**Update Truck Driver Assignment**	

Figure 29 Manage Export Container Detail

3.21.5 Impact on Database Design

Two business rules must be added to the original design in section 4.3.6. These rules will differentiate some characteristics between Import and Export.

Code	Name	Comment
OP_BLDNG_3	Bill of Lading Mandatory fields rule	For Import scenarios, the Bill of Lading fields that refer to this rule are mandatory. For Export scenarios, the Bill of Lading fields that refer to this rule are optional. Note: See Physical Data Model
OP_STDSUBORD_3	Standard Order Mandatory fields rule	For Import scenarios, the Standard Suborder fields that refer to this rule are mandatory. For Export scenarios, the Standard Suborder fields that refer to this rule are optional. Note: See Physical Data Model
OP_UNIT_2	Unit Summary Mandatory fields rule	For Import scenarios, the Unit Summary fields that refer to this rule are mandatory. For Export scenarios, the Unit Summary fields that refer to this rule are optional. Note: See Physical Data Model

Table 64 Impact on Database Design

4 DATABASE

4.1 The Port of Montreal Extranet Data Model

The purpose of the Port of Montreal Extranet database is to collect and organize information sent by all stakeholders so that it is easily accessible and responds to the business needs of the various actors.

After determining the business reality of the Terminals, Freight Forwarders, Trucking Companies, Shipping Lines, and Government agencies, the Conceptual Data Model was designed to represent the key business concepts and constraints related to Container status management, in the context of import and export Terminals. A Physical Data Model was then derived to represent the business concepts and constraints in terms of database components. Sybase's PowerDesigner 7.5 case tool was used to perform these steps and generate the model for an MS SQL Server 2000 platform. This section presents the main features of the Physical Data Model.

4.1.1 Concepts Appearing in the Data Model

Actor:	Generic stakeholder who plays a role in the Extranet. An actor can be a Carrier (trucking or railway), a Freight Forwarder, a Shipping Line, a Terminal, a Port, a Broker, or a Government agency.
Bill of Lading:	Official document prepared by the Freight Forwarder and transmitted to the Shipping Lines to form the Manifest. It refers to 'loaded' units (Containers) under their responsibility that share the same voyage at the Port of Montreal.
Booking number:	Reservation number provided by a Shipping Line to a customer in order to reserve room on a voyage. Most Booking reservations are performed by the Freight Forwarder. The booking number is used in the Export process.
Instruction to Truck Driver:	Process used by the Trucking Company to match an Order to Carrier with a Truck Driver.
Order to Carrier:	Process performed by the Freight Forwarder to assign a transportation request to a specific Carrier. A Carrier can be a Trucking Company or a Railway Carrier. The Order to Carrier tells the Carrier what to pick up, from where, to where, and whether special equipment is needed.
Unit:	Although the term Container is widely used in the Port area, the word Unit is preferred for the purposes of this report. Containers, semitrailers, and other shippable components are considered to be intermodal units.
Unit Events:	A Unit Event displays the current state of a Unit: on board a Ship, grounded, held or released (e.g., by Customs), in-gate or out-gate from the Terminal, or ramped. The purpose of Unit Events is to establish the current status of the Unit in the Extranet so that the various Actors know when to perform their tasks.
Vessel:	A ship that berths at one of the Port's Terminals.
Voyage Number:	Each vessel arrival at a Port Terminal corresponds to a unique Voyage number. The departure of each vessel from a Port Terminal corresponds to another unique Voyage number.

4.1.2 Constraints Appearing in the Data Model

Constraints in the model are used to reflect the Business Models of the various Actors. Constraints are represented by rules, relationships between data, and associations.

Cardinality: The Cardinality constraint indicates the nature of the relationship between two tables. For example, in the relationship between UNIT SUMMARY[1] and ACTUAL EVENT:

- The arrow that ends at UNIT SUMMARY indicates that one ACTUAL EVENT always refers to one and only one UNIT SUMMARY;
- The numbers at the other end of the relationship (1..*) indicate that one UNIT SUMMARY always refers to at least one ACTUAL EVENT, and at most * (meaning any number of) ACTUAL EVENTs.

Operational: An integrity constraint specifies how the rule is attached to a relationship, a table record, or a table attribute or set of attributes. For example, given OP_ACTLEVT_1 operational constraint:

> The constraint indicates that the releases Canada Customs sends to the Terminal may concern only part of a unit. The Extranet manages releases only at the unit level. The Terminal must gather all releases concerning a whole unit and enter a release by Canada Customs only when all the unit's components are released.

4.1.3 Basic Definitions Concerning the Relational Model

Primary Key: corresponds to a table attribute (or set of attributes) that ensures each record of a table is distinct.

> For instance, the VSSL ID and VYGE NBR attributes form the primary key of the VOYAGE table.

Table: combines various attributes that all rely on the same primary key.

> For instance, the attributes ACTR ROLE CD, ACTR GEN ADDRESS, and all other fields within the ACTOR table depend on the primary key PORT ID + ACTR ID. The union of these attributes and their primary key results in the ACTOR table.

Foreign Key: corresponds to an attribute (or set of attributes) used to define a relationship between two or more tables.

> For instance, the attributes FF PORT ID and FF ACTR ID in the BILL OF LADING table form a foreign key, which points to the primary key of the target table.

Index: consists of an attribute (or set of attributes) used to determine the location of a record in a table.

> For instance, the attributes FF PORT ID and FF ACTR ID in the BILL OF LADING table form an index.

---

[1] Words in CAPITAL letters represent database tables.

4.1.4 Overview of the Data Model

As can be seen in Figure 30, the data model is divided into four main areas, each corresponding to an ACTOR responsibility and role:

- **The Shipping Line area** is represented by the pink boxes on the Model Level Diagram. The Shipping Line's responsibility is to provide the Extranet with Vessel manifests. There is only one Vessel manifest per Voyage and it comprises all the BILLs OF LADING related to that Voyage. The BILL OF LADING is a group of UNIT SUMMARies (Containers).
- **The Terminal area** is represented by the green boxes on the Model Level Diagram. The Terminal's responsibility is to provide the Extranet with ACTUAL EVENT data for the entire unit as soon as it becomes available or changes. The Terminal is the central point for all Actual Events. It collects all the events sent by the other actors and forwards them to the Extranet database.
- **The Freight Forwarder area** is represented by the blue boxes on the Model Level Diagram. The Freight Forwarder's responsibility is to prepare the ORDER to Carrier, which consists of assigning transportation requests concerning UNITs to specific Carriers.
- **The Carrier area** is represented by the yellow boxes on the Model Level Diagram. The Trucking Company completes the ORDERs to Carrier that were assigned to it by adding to each order an INSTRUCTION TO TRUCK DRIVER. The instruction assigns a Truck Driver to a given order while adding special instructions intended for the Truck Driver, such as equipment needed, truck number, etc.

Each of these four areas is subdivided into static and dynamic information. **Static information** concerns the registration of stakeholders as members of the Extranet and includes information such as addresses, telephone numbers, and names of the stakeholders.

Dynamic information concerns all information related to management of the Unit Status in the context of import and export voyages in a Terminal. The dynamic components include the VOYAGE, BILLs OF LADING, UNITs, and ACTUAL EVENTs, as well as the assignment by the Freight Forwarders of the Carriers via the ORDER to Carrier and INSTRUCTION to Truck Driver.

Note: The list of actors also includes non-active stakeholders such as Canada Customs, Agriculture Canada, the brokers, and the Port of Montreal. These non-active actors do not provide data directly to the Extranet, rather they submit it to the Terminals, which then supply it to the Extranet.

4.1.5 Static Components in the Model

The static components appear as plain boxes (no shadow) in the data model. The most important static component of the database is the ACTOR entity, which is a specific occurrence of a Shipping Line, Terminal, Freight Forwarder, Carrier, or Government agency that exists only in the context of a Port. Note that a Port is also an ACTOR.

An ACTOR has an official NAME that can be represented in many languages or acronyms. The SYNONYMs table helps identify the actor when the name provided in a batch entry does not match an official actor's name. The System Administrator manages the ACTORS in the Extranet, which cannot be updated on-line by anyone else for security reasons.

Example: Cast-Racine is a Terminal ACTOR existing in the context of the Port of Montreal. Its English NAME is Cast-Racine Terminal; its French NAME is Gare intermodale Cast-Racine. It has up to three CONTACT PERSONs. Its SYNONYMs are: Cast Racine, Cast-Racine, Cast-Racine Term, and Terminal Cast-Racine.

4.1.6 Flow of Information in the Model

The dynamic components appear as shadowed boxes in the data model. These components are sent to the Extranet using batch entries, except in the case of assignments made by the Freight Forwarder and the Carrier.

4.1.7 The Export Process

When units are empty

The Shipping Line ACTOR creates a VOYAGE (no BILL OF LADING known yet) that will leave from a terminal at the Port of Montreal. In the context of the VOYAGE, any Freight Forwarder ACTOR (attached to the Port) creates an ORDER (Free-Form or Empty Memo) to indicate a Carrier ACTOR that will pick up the empty unit.

Example: Canmar Shipping Line just created the Vessel manifest for the Victory 123 export VOYAGE in the Extranet. Each time Geologistic (or any other Freight Forwarder related to the Port) requires room for units on this VOYAGE, a booking number request is placed. Geologistic can then prepare the ORDERs to pick up the empty units that will be (generally) exported using this VOYAGE. The ORDER then is assigned to a Carrier ACTOR.

The free-form ORDER note may look like this:

- "At *source location*, pick up 20 x 40' open top and deliver to *target location* for *specific date*"

When units are loaded

Once the Freight Forwarder ACTOR has prepared a hard copy of the Bill of Lading, it sends it (usually by fax) to the Shipping Line ACTOR responsible for the Voyage. The Shipping Line ACTOR then updates the VOYAGE in the Extranet with the attached BILL OF LADING information and related UNIT SUMMARY information by sending an updated version of the Vessel manifest to the Extranet.

As soon as the BILL OF LADING appears in the Extranet, the Freight Forwarder ACTOR responsible for it prepares an ORDER TO CARRIER (standard order) for each loaded UNIT listed on the BILL OF LADING. Each UNIT is assigned to a Carrier ACTOR.

- If the target Carrier ACTOR is a Trucking Company, then the Trucking Company ACTOR accesses these ORDERs via the Extranet and adds the INSTRUCTIONs by assigning a TRUCK DRIVER for each unit. The UNIT movements are controlled at the TERMINAL. The Terminal ACTOR creates an in-gate event in the ACTUAL EVENT by filling out a corresponding TIR (Terminal Interchange Report) and updating it in the Extranet. Once the Unit is loaded onto the Vessel, a new TIR is prepared and sent to the Extranet, and the status On Ship is entered in the ACTUAL EVENT.
- If the target Carrier ACTOR is a Railway Carrier, there is no INSTRUCTION to manage.

Example: The Geologistic Freight Forwarder sends a copy of the Bill of Lading to Canmar related to the Victory 123 Voyage. The Bill of Lading GEOLOGISTIC-BL1234999 concerns the units GEOU 1234567 and GEOU 0345678, and includes descriptions of each Container, its contents, and specific instructions for these units once the ship has arrived at its destination.

Canmar accumulates a few Bills of Lading (paper versions) and prepares a Vessel manifest batch entry to be sent to the Extranet database. Once the manifest is in the database, Geologistic can browse for the Bill of Lading GEOLOGISTIC-BL1234999 and prepare one ORDER for each unit:

- GEOU 1234567 is assigned to *Trucking Company 1* and GEOU 0345678 is assigned to *Trucking Company 2*.
- When Trucking Company 1 browses or uses report functions in the Extranet Units for the voyage Victory 123, it sees that the GEOU 1234567 unit was assigned to it and makes the necessary arrangements to complete this order. It then assigns a Truck Driver to the unit by creating an Instruction. The situation is similar for Trucking Company 2.

4.1.8 The Import Process

When units are loaded (full)

While the vessel is at sea, the Shipping Line ACTOR creates the VOYAGE and attaches the BILLs OF LADING and related UNITS in the Extranet by sending a batch file.

The Freight Forwarder ACTOR then prepares standard ORDERs (one per unit) and assigns each unit to a Carrier ACTOR. In these ORDERs, the Freight Forwarder notifies the Carrier what is to be done with the UNIT once it is empty. The Trucking Company ACTOR transforms the ORDER into an INSTRUCTION by assigning a TRUCK DRIVER.

At the same time, the Terminal ACTOR receives hold and release information (from the Shipping Line, Canada Customs, and Agriculture Canada) and transmits it to the Extranet.

When the requested releases (stored as ACTUAL EVENTs) are obtained and the unit is grounded (another ACTUAL EVENT), the truck driver can pick up the unit. An out-gate ACTUAL EVENT is created via a TIR once the unit is picked up.

Example: While the Victory 161 Voyage is on its way to Montreal, the Geologistic Freight Forwarder receives an overseas Bill of Lading concerning the GEOU 3333333 and GEOU 4444444 units. Canmar, the Shipping Line, prepares a Vessel manifest batch entry to be sent to the Extranet Database. This creates the VOYAGE, BILLs OF LADING and UNIT SUMMARies in the Extranet. Once the manifest is in the database, Geologistic browses the OVERSEA-BL99991 BILL OF LADING and prepares one ORDER for each UNIT:

- GEOU 3333333 is assigned to Trucking Co. 1 and GEOU 4444444 is assigned to 'Trucking Co. 1.
- When Trucking Co. 1 browses the Extranet UNITs for the Victory 161 VOYAGE, it sees that it was assigned the GEOU 3333333 and GEOU 4444444 Units and makes the necessary arrangements to complete these ORDERs. A Truck Driver is assigned to each unit by creating two INSTRUCTIONs.
- Once the Vessel reaches a berth at the Cast-Racine Terminal, the Units are grounded (grounded ACTUAL EVENTs are entered). Canada Customs and Agriculture Canada inspect these Units and send releases to the Terminal. Cast-Racine enters the following ACTUAL EVENTs in the Extranet for these two Units: Release from Canada Customs, and Release from Agriculture Canada.
- Canmar sends its own Shipping Line Releases to Cast-Racine, who creates new ACTUAL EVENTs for these releases. The Units are then ready to be picked up as soon as the Terminal sends the final release. The assigned Truck Driver arrives at the Terminal and picks up both Units. At the gate, the Units are entered as out-gate by a TIR made by the Terminal.

4.1.9 Miscellaneous

Cancellations may occur at many levels

- An ACTUAL EVENT of a unit may be cancelled;
- A BILL OF LADING may be cancelled: this involves the automatic cancellation of its related UNITs and ACTUAL EVENTs, as well as the attached ORDERs and INSTRUCTIONs;
- A entire VOYAGE may be cancelled: this involves the automatic cancellation of its BILLs OF LADING, related UNITs and ACTUAL EVENTs, as well as the attached ORDERs and INSTRUCTIONs;
- An ORDER may be cancelled: this means that the attached INSTRUCTION must be cancelled at the same time;
- An INSTRUCTION may be cancelled.

Multilingual aspects in the data model

- Names of the ACTORs;
- Descriptions attached to the list of ACTUAL EVENTs (and other lists);
- The Port of Montreal Extranet implementation will support English and French. The model can, however, support many other languages simultaneously.

Expansibility of the data model

- For the purposes of the present application, a standard ORDER always refers to one UNIT. The data model can, however, allow the same ORDER to process more than one UNIT. This can be validated by looking at the ORDER – SUBORDER relationship cardinalities on the model. Note that a standard ORDER remains attached to one and only one BILL OF LADING, and that the ORDER is assigned to one and only one Carrier.
- For the purposes of the present application, an INSTRUCTION always refers to one UNIT. The data model can, however, allow the same INSTRUCTION to refer to more than one UNIT. This can be validated by looking at the INSTRUCTION – SUBINSTRUCTION relationship cardinalities in the model. Note that an INSTRUCTION remains attached to one and only one TRUCK DRIVER.
- To simplify the presentation of the application, the SUBORDER and SUBINSTRUCTION tables are not mentionned even if they are used. However, one could look at the relationship between the SUBORDER (a child of ORDER) and the SUBINSTRUCTION (a child of INSTRUCTION). This relationship means that an INSTRUCTION could group the processing of many SUBORDERS, because each SUBINSTRUCTION 'processes' a SUBORDER.

Parameters

- A few parameters concerning special configurations, archiving, and reporting will be kept in the related table of the database.

Database technical aspects

- The volume of data is relatively low;
- The current Extranet database will always contain a minimum amount of data for a short period (about 1 month). The reporting database will contain the data for a longer period (2 years).

4.2 PDM Diagram

4.2.1 Model Level Diagram

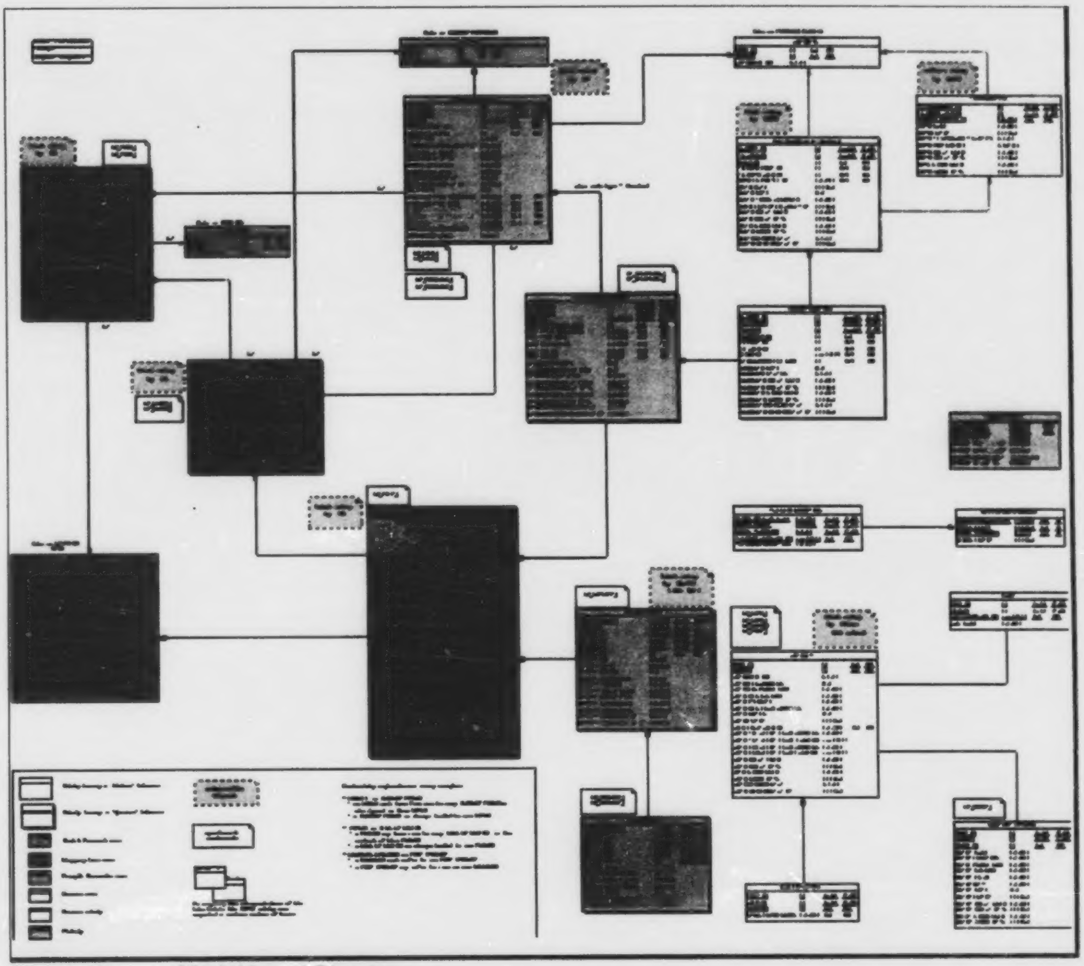


Figure 30 Model Level Diagram

Note: Refer to Appendix E for a larger view of the Model Level Diagram.

4.3 Lists of Objects

4.3.1 Table List

Name	Comment	Number of Records
ACTOR	An ACTOR is an entity defined in the context of a port. An Actor has a NAME (that can be translated in many languages) and may have up to three CONTACT PERSONS. SYNONYM keywords can be attached to each Actor. Actors are managed by the Port Business Administration. IMPORTANT NOTE: The first Actor to be defined in the Extranet is the Port itself. A Port Actor will have "Port" for Actor's role. The Port Actor records will have another characteristic: Port ID = Actor ID.	100
ACTUAL EVENT	An ACTUAL EVENT contains the information related to an event that occurred to a unit, in the context of its BILL OF LADING. In most cases, Actual Events will be reported to the Terminal who will enter them in the Extranet database. For example, "a given unit was released by Customs at a given date and time" is an Actual Event. A UNIT SUMMARY contains many Actual Events.	15,000,000
BILL OF LADING	A BILL OF LADING is a group of units that are processed in a similar way, for import or export (of loaded units). The details of a Bill of Lading include the unit's contents, origin, sender, receiver, final delivery, Freight Forwarder at origin, Freight Forwarder at Vessel destination, etc. The VOYAGE, its Bills of Lading, and the attached units are created using an electronic transaction sent by a Shipping Line to a Terminal, under the name Vessel Manifest.	500,000
CANCEL INFO	A CANCEL INFO is created each time an Actual Event is cancelled. It is then possible to keep track of the context of the cancellation (date, time, reason, and free-form memo).	25,000
CONTACT PERSON	A CONTACT PERSON is a representative of an Actor created in the context of a Port. Each Actor must provide one to three contacts (a minimum of one is required).	300
INSTRUCTION TO TRUCK DRIVER	An INSTRUCTION TO TRUCK DRIVER is prepared by the Trucking Company specified in the ORDER TO CARRIER sent by the Freight Forwarder. An Instruction is the development of a standard Order. Generally, the Order gives the Carrier the responsibility of assigning a Truck Driver who will execute the tasks listed on the Order.	750,000
NAME	The NAME of an Actor, in any given language, ensures that critical attributes can be kept/displayed in more than one language. For example, Actor #0801 has "ASDF Steamship Lines" as its English Name and "Les lignes maritimes ASDF" as ita French Name. These names are used as examples only.	200

Name	Comment	Number of Records
SYNONYM	SYNONYMs are a way to ensure that the Actor's name received from external files (e.g., EDI files) can be interpreted by the Extranet. For instance, the official name of a company called Great Group ABCD Inc. may have the following corresponding synonyms: GG ABCD, G Group ABCD, G Grp ABCD, and Grt Grp ABCD. Synonyms are used to identify an Actor mentioned in a batch entry.	1000
ORDER TO CARRIER	An ORDER TO CARRIER is prepared by the Freight Forwarder specified in the Bill of Lading. There are two types of Orders: • Standard Order: used in situations where the Vessel manifest (which includes the units to be listed on the Order) has been entered into the Extranet database. It essentially supports the import and export processes of loaded units. • Free-Form Order: used in situations where the units involved do not exist in the database. It is also used when unit identifiers cannot be specified by its creator. It essentially supports the pickup and delivery processes of empty units.	1,000,000
PARAMETERS	Utility table that contains parameters related to reports. The structure and columns must be reviewed during the development phase.	
REFERENCED DOMAIN	List of the domains that are referenced by some attributes. A domain is attached to one or more attributes of the Extranet database.	500
STANDARD SUBORDER	A STANDARD SUBORDER represents the assignment of a work order to a Carrier concerning a unit existing in the database. Each assignment contains the details of the operations the carrier must perform.	750,000
SUBINSTRUCTION	A SUBINSTRUCTION contains one of the units involved in the instruction.	750,000
TRUCK DRIVER	A TRUCK DRIVER exists only in the context of a Carrier (Trucking Company), which itself only exists in the context of a Port. Essentially, a Truck Driver is assigned to perform an Instruction.	1000
UNIT SUMMARY	A UNIT SUMMARY contains the static part of a unit's information when that unit is created in the Extranet database. The information comes from the Bill of Lading on which the unit is declared. Generally, the changes that will occur to an event will be reflected in the actual event entity.	1,500,000
VALUE DESCRIPTION	Each Value code must have one or more descriptions by language.	1000
VOYAGE	The VOYAGE is the first step in the data creation for all import and export loaded units. The Voyage and its dependents (Bills of Lading and attached units) are created using an EDI transaction sent by a Shipping Line to a Terminal, under the name Vessel Manifest.	10,000

Table 65 Table List

4.3.2 Table Columns List

Table	Code	Data Type	Comment	Domain
ACTOR	ACTR 1st ALERT EMAIL LANG CD	numeric(1)	Language to be used in the e-mail alerts sent to the ACTR E-MAIL ALERT1 address.	D_LANGUAGE
ACTOR	ACTR 1st ALERT EMAIL ADDRESS	char(50)	E-mail address to which the first alert will be sent when the Actor must be alerted.	<None>
ACTOR	ACTR 2nd ALERT EMAIL ADDRESS	char(50)	E-mail address to which the second alert will be sent when the Actor must be alerted.	<None>
ACTOR	ACTR 2nd ALERT EMAIL LANG CD	numeric(1)	Language to be used in the e-mail alerts sent to the ACTR E-MAIL ALERT2 address.	D_LANGUAGE
ACTOR	ACTR CREAT DTTM	datetime	Date and time of the creation of the Actor information.	<None>
ACTOR	ACTR CREAT USER	char(20)	User who created the Actor information.	<None>
ACTOR	ACTR EXP DT	datetime	Date after which the Actor ceases to be active in the system.	<None>
ACTOR	ACTR GEN ADDRESS	text	General address of the Actor.	<None>
ACTOR	ACTR GEN EMAIL ADDRESS	char(50)	General e-mail address of the Actor.	<None>
ACTOR	ACTR GEN FAX NBR	char(20)	General fax number of the Actor.	<None>
ACTOR	ACTR GEN PHONE NBR	char(20)	General telephone number of the Actor.	<None>
ACTOR	ACTR ID	int	ID of the Actor, unique in the entire system (system-generated).	<None>
ACTOR	ACTR LDAP ACTR ID	char(69)	This field is entered by the Administrator. It corresponds to an entry done in the LDAP (security). It represents the second unique criterion of the ACTOR table. The application uses this field to determine who the current ACTOR is. The format is: XXXX-XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	<None>

Table	Code	Data Type	Comment	Domain
			XXXXXXXXXXXXXXXXXXXXXXXX-999. The first 4 digits identify the role of the Actor (e.g., FFWD, SHPL, PORT, TERM, CART, CARR.) Following a dash, the next 60 characters represent the English name of the Actor. Following a second dash is a version number (from 1 to 999).	
ACTOR	ACTR MODIF DTTM	datetime	Date and time of the most recent modification made to the Actor information.	<None>
ACTOR	ACTR MODIF USER	char(20)	User who first modified the Actor information.	<None>
ACTOR	ACTR NOTES	text	Free-form text containing pertinent information about the Actor.	<None>
ACTOR	ACTR RECORD STAT	char(1)	Field that indicates whether a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT
ACTOR	ACTR RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
ACTOR	ACTR ROLE CD	char(2)	Role of the Actor: Port, Terminal, Shipping Line, Freight Forwarder, Carrier - Truck, Carrier - Railway.	D_ACTR_ROLE
ACTOR	ACTR WEB SITE	char(60)	Web site of the Actor, if it exists.	<None>
ACTOR	PORT ID	int	ID of the Port, unique in the entire system (system-generated).	<None>
ACTUAL EVENT	ACTLEVT CANCEL IND	char(1)	Indicates whether a Unit's Actual Event has been cancelled.	D_YESNO
ACTUAL EVENT	ACTLEVT CD	char(4)	The event that was reported to a Unit. For instance, a Unit was released by Agricuture Canada (= "RLAC").	D_UNIT_EVENT
ACTUAL EVENT	ACTLEVT CREAT DTTM	datetime	Date and time when the event was reported into the database.	<None>

Table	Code	Data Type	Comment	Domain
ACTUAL EVENT	ACTLEVT CREAT USER	char(20)	User who reported the event.	<None>
ACTUAL EVENT	ACTLEVT DTTM	datetime	Date and time the event occurred.	<None>
ACTUAL EVENT	ACTLEVT ID	int	ID of the event, in the context of the Unit Summary (system-generated).	<None>
ACTUAL EVENT	ACTLEVT MODIF DTTM	datetime	Date and time of the last modification of the Unit's Actual Event.	<None>
ACTUAL EVENT	ACTLEVT MODIF USER	char(20)	Last user who modified the Unit's Actual Event information.	<None>
ACTUAL EVENT	ACTLEVT NOTES	text	Free-form text containing pertinent information about the Actual Event.	<None>
ACTUAL EVENT	ACTLEVT RECORD STAT	char(1)	Field that indicates whether a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_ STAT
ACTUAL EVENT	ACTLEVT RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
ACTUAL EVENT	ACTLEVT TIR NBR	char(20)	Contains the TIR (Terminal Interchange Report) number attached to an Actual Event.	<None>
ACTUAL EVENT	BLDNG NBR	char(20)	ID of the Bill of Lading created by a Freight Forwarder in the context of the Voyage. The foreign key indicates the Bill of Lading related to this Unit.	<None>
ACTUAL EVENT	UNIT INIT ID	char(4)	Initials of the Unit ID represented by the first four characters (e.g., CNRU in CNRU1234567).	<None>
ACTUAL EVENT	UNIT NBR ID	char(7)	Numbers of the Unit ID represented by the last seven digits (e.g., 1234567 in CNRU1234567).	<None>
ACTUAL EVENT	VYGE NBR	char(15)	Voyage number of the Vessel on the Bill of Lading related to the Unit.	<None>
ACTUAL EVENT	VYGE VESSEL ID	char(30)	Name of the Vessel on the Bill of Lading related to the Unit.	<None>

Table	Code	Data Type	Comment	Domain
BILL OF LADING	BLDNG CANCEL IND	char(1)	Indicates whether the Bill of Lading is cancelled.	D_YESNO
BILL OF LADING	BLDNG CARGO CTRL NBR	char(40)	Reference number used by Customs. Display only.	<None>
BILL OF LADING	BLDNG CONSIGNEE	text	The consignee (target receiver) of the Units listed on the Bill of Lading.	<None>
BILL OF LADING	BLDNG CREAT DTTM	datetime	Date and time of the creation of the Bill of Lading information.	<None>
BILL OF LADING	BLDNG CREAT USER	char(20)	User who created the Bill of Lading information.	<None>
BILL OF LADING	BLDNG DATE	datetime	Date on which the Bill of Lading was modified by a Freight Forwarder.	<None>
BILL OF LADING	BLDNG MODIF DTTM	datetime	Date and time of the last modification made to the Bill of Lading information.	<None>
BILL OF LADING	BLDNG MODIF USER	char(20)	Last user who modified the Bill of Lading information.	<None>
BILL OF LADING	BLDNG NBR	char(20)	ID of the Bill of Lading created by a Freight Forwarder in the context of the Voyage (provided by the Vessel Manifest).	<None>
BILL OF LADING	BLDNG RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT
BILL OF LADING	BLDNG RECORD STAT DT	datetime	Field that indicates when a record became part of history data (D). This date is mandatory when the Record status is D.	<None>
BILL OF LADING	BLDNG SHIPPER	datetime	Shipper (sender at origin) of the Units listed on the Bill of Lading.	<None>
BILL OF LADING	FF ACTR ID	int	ID of the Freight Forwarder Actor responsible for the Bill of Lading unique in the entire system.	<None>
BILL OF LADING	FF PORT ID	int	ID of the Freight Forwarder responsible for the Bill of Lading, unique in the entire system.	<None>
BILL OF LADING	VYGE NBR	char(15)	Voyage number of the Vessel on the Bill of Lading.	<None>

Table	Code	Data Type	Comment	Domain
BILL OF LADING	VYGE VESSEL ID	char(30)	Name of the Vessel on the Bill of Lading.	<None>
CANCEL INFO	ACTLEVT ID	int	ID of the Actual Event in the context of the Unit Summary (system-generated).	<None>
CANCEL INFO	BLDNG NBR	char(20)	ID of the Bill of Lading created by a Freight Forwarder in the context of the Voyage. The foreign key indicates the Bill of Lading related to this Unit.	<None>
CANCEL INFO	CNCLINF CREAT DTTM	datetime	Date and time of the creation of the Cancelled Event History information.	<None>
CANCEL INFO	CNCLINF CREAT USER	char(20)	User who created the Cancelled Event History information.	<None>
CANCEL INFO	CNCLINF DTTM	datetime	Date and time of the cancellation of the Actual Event.	<None>
CANCEL INFO	CNCLINF NOTE	text	Free-form text for the user to document the cancellation.	<None>
CANCEL INFO	CNCLINF REASON CD	int	General code to indicate the reason of the cancellation.	D_CANCEL_RSN
CANCEL INFO	CNCLINF RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT
CANCEL INFO	CNCLINF RECORD STAT DT	datetime	Field that indicates when a record became part of history data (D). This date is mandatory when the Record status is D.	<None>
CANCEL INFO	UNIT INIT ID	char(4)	Initials of the unit ID represented by the first four characters (e.g., CNRU in CNRU1234567).	<None>
CANCEL INFO	UNIT NBR ID	char(7)	Numbers of the unit ID represented by the last seven digits (e.g., 1234567 in CNRU1234567).	<None>
CANCEL INFO	VYGE NBR	char(15)	Voyage number of the Vessel on the Bill of Lading related to the Unit.	<None>
CANCEL INFO	VYGE VESSEL ID	char(30)	Name of the Vessel on the Bill of Lading related to the Unit.	<None>

Table	Code	Data Type	Comment	Domain
CONTACT PERSON	ACTR ID	int	ID of the Actor, unique in the entire system, in the context of a Port.	<None>
CONTACT PERSON	CNTCT CITY	char(30)	City where the Contact Person is located.	<None>
CONTACT PERSON	CNTCT CREAT DTTM	datetime	Date and time of the creation of the Contact Person information.	<None>
CONTACT PERSON	CNTCT CREAT USER	char(20)	User who created the Contact Person information.	<None>
CONTACT PERSON	CNTCT EMAIL	char(50)	E-mail address of the Contact Person.	<None>
CONTACT PERSON	CNTCT EXP DT	datetime	Date after which the Contact Person ceases to be active in the system.	<None>
CONTACT PERSON	CNTCT FAX NBR	char(20)	Fax number of the Contact Person.	<None>
CONTACT PERSON	CNTCT FUNCTION	char(50)	Title/function of the Contact Person.	<None>
CONTACT PERSON	CNTCT ID	int	System-generated ID of the Contact Person representing a given entity (e.g., a Shipping Line). Up to three contacts per entity.	<None>
CONTACT PERSON	CNTCT MODIF DTTM	datetime	Date and time of the last modification made to the Contact Person information.	<None>
CONTACT PERSON	CNTCT MODIF USER	char(20)	Last user who modified the Contact Person information.	<None>
CONTACT PERSON	CNTCT NAME	char(50)	Name of the Contact Person.	<None>
CONTACT PERSON	CNTCT NOTE	text	Free-form text containing pertinent information about the Contact Person.	<None>
CONTACT PERSON	CNTCT PHONE NBR	char(20)	Telephone number of the Contact Person.	<None>
CONTACT PERSON	PORT ID	int	ID of the Port that represents the Actor, unique in the entire system.	<None>
INSTRUCTION TO TRUCK DRIVER	DRVR EMPLOYEE ID	char(10)	Employee number of the Truck Driver, in the context of the related Trucking Company.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR CREAT DTTM	datetime	Date and time of the creation of the Instruction to Truck Driver information.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR CREAT USER	char(20)	User who created the Instruction to Truck Driver information.	<None>

Table	Code	Data Type	Comment	Domain
INSTRUCTION TO TRUCK DRIVER	INSTR DATE	datetime	Date after which the Instruction to Truck Driver is no longer in effect.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR EXPECTED ACHIEV DT	datetime	Expected date of completion of the Instruction to Truck Driver (e.g., delivery made by the Truck Driver).	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR ID	int	System-generated ID of the Instruction to Truck Driver, in the context of the Trucking Company that created it.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR MODIF DTTM	datetime	Date and time of the last modification made to the Instruction to Truck Driver information.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR MODIF USER	char(20)	Last user who modified the Instruction to Truck Driver information.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR NOTE	text	Free-form text containing pertinent information about the Instruction to Truck Driver.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of history data (D).	D_RECORD_ STAT
INSTRUCTION TO TRUCK DRIVER	INSTR RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
INSTRUCTION TO TRUCK DRIVER	INSTR TRUCK ASSIGNED	char(30)	ID of the truck assigned to the Instruction to Truck Driver.	<None>
INSTRUCTION TO TRUCK DRIVER	TK ACTR ID	int	ID of the Actor, unique in the whole system. It represents the Truck Driver (in the context of a Port) who created the Instruction.	<None>
INSTRUCTION TO TRUCK DRIVER	TK DRVR ACTR ID	int	ID of the Actor, unique in the whole system. It represents the Trucking Company (in the context of a Port) that hired the Truck Driver.	<None>
INSTRUCTION TO TRUCK DRIVER	TK DRVR PORT ID	int	ID of the Port, unique in the whole system. It represents the Port of the Trucking	<None>

Table	Code	Data Type	Comment	Domain
			Company (in the context of a Port) that hired the Truck Driver.	
INSTRUCTION TO TRUCK DRIVER	TK PORT ID	int	ID of the Port, unique in the whole system. It represents the Port of the Truck Driver (in the context of a Port) who created the Instruction.	<None>
NAME	ACTR ID	int	ID of the Actor, unique in the entire system, in the context of a Port.	<None>
NAME	NAM LANGUAGE CD	numeric(1)	ID of the language, unique in the entire system. The language code allows the database to keep one Actor Name per language.	D_LANGUAGE
NAME	NAM NAME	char(60)	Name of the Actor, in a given language. So far, only French and English are defined.	<None>
NAME	PORT ID	int	ID of the Port of the Actor's name, unique in the whole system.	<None>
NAME SYNONYM	ACTR ID	int	ID of the Actor, unique in the entire system, in the context of a Port.	<None>
NAME SYNONYM	PORT ID	int	ID of the Port of the Actor, unique in the entire system.	<None>
NAME SYNONYM	SYNM EXPRESSION	char(60)	String expression considered equivalent to the Actor Names (French, English, or other).	<None>
NAME SYNONYM	SYNM ID	int	System-generated ID of the Synonym, in the context of an Actor.	<None>
ORDER TO CARRIER	CARRIER ACTR ID	int	ID of the Carrier Actor (in the context of a Port) that was assigned the Order, unique in the entire system. The Carrier can be a Trucking company or a Railway company.	<None>
ORDER TO CARRIER	CARRIER PORT ID	int	ID of the Port of the Carrier that was assigned the Order to Carrier, unique in the entire system.	<None>
ORDER TO CARRIER	FF ACTR ID	int	ID of the Freight Forwarder Actor that created the Order to Carrier, unique in the entire system.	<None>
ORDER TO CARRIER	FF PORT ID	int	ID of the Port of the Freight Forwarder that created the	<None>

Table	Code	Data Type	Comment	Domain
			Order to Carrier, unique in the entire system.	
ORDER TO CARRIER	FREORDR BOOKING NBR	char(20)	ID of the Booking provided by the Shipping Line, in the context of a Voyage. Used in the Export process only to pick up empty units at the Terminal (entered by Freight Forwarder).	<None>
ORDER TO CARRIER	FREORDR STATUS	char(2)	Status of the current Standard Order Detail line. For future use only.	D_ORDER_STAT
ORDER TO CARRIER	FREORDR VYGE NBR	char(15)	Number of the Voyage necessary to identify the Booking related to a free-form Order to Carrier.	<None>
ORDER TO CARRIER	FREORDR VYGE VESSEL ID	char(30)	Name of the Vessel necessary to identify the Booking related to a free-form Order to Carrier.	<None>
ORDER TO CARRIER	ORDR CREAT DTTM	datetime	Date and time of the creation of the Order to Carrier in the Database.	<None>
ORDER TO CARRIER	ORDR CREAT USER	char(20)	User who created the Order to Carrier information.	<None>
ORDER TO CARRIER	ORDR EXPECTED ACHIEV DT	datetime	Expected date of completion of the Order to Carrier (e.g., delivery made by the Carrier).	<None>
ORDER TO CARRIER	ORDR ID	numeric(9)	System-generated ID of the Order to Carrier, in the context of the current Freight Forwarder that created it.	<None>
ORDER TO CARRIER	ORDR MODIF DTTM	datetime	Date and time of the last modification made to the Order to Carrier information.	<None>
ORDER TO CARRIER	ORDR MODIF USER	char(20)	Last user who modified the Order to Carrier information.	<None>
ORDER TO CARRIER	ORDR NOTE	text	Free-form text containing pertinent information about the Order to Carrier (for any order type).	<None>
ORDER TO CARRIER	ORDR RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT

Table	Code	Data Type	Comment	Domain
ORDER TO CARRIER	ORDR RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
ORDER TO CARRIER	ORDR TYPE	char(1)	Tag indicating if the Order to Carrier is a memo or a Standard Order specifying Units related to an existing Bill of Lading.	D_ORDR_ TYPE
ORDER TO CARRIER	STDORDR BLDNG NBR	char(20)	Bill of Lading number necessary to identify the Bill of Lading related to a Standard Order.	<None>
ORDER TO CARRIER	STDORDR VYGE NBR	char(15)	Number of the Voyage necessary to identify the Bill of Lading related to a Standard Order.	<None>
ORDER TO CARRIER	STDORDR VYGE VESSEL ID	char(30)	Name of the Vessel necessary to identify the Bill of Lading related to a Standard Order.	<None>
PARAMETERS	REPORT EFF DT	datetime	To be defined.	<None>
PARAMETERS	REPORT EXP DT	datetime	To be defined.	<None>
PARAMETERS	REPORT FREQUENCY	<Undefined>	To be defined.	<None>
PARAMETERS	REPORT NAME	char(30)	To be defined.	<None>
PARAMETERS	REPORT NEXT RUN DT	datetime	To be defined.	<None>
PARAMETERS	REPORT PREV RUN DT	datetime	To be defined.	<None>
PARAMETERS	REPORT START TM	datetime	To be defined.	<None>
REFERENCED DOMAIN	RFDOM DOMAIN NAME	char(60)	Name of a domain referenced by attributes. For instance, d_unit_event is the domain restricting the possible values of the attribute actlevt cd.	<None>
REFERENCED DOMAIN	RFDOM EFF DT	datetime	A referenced domain may change over time. Therefore, domains are identified by version, which is indicated by effective date.	<None>
REFERENCED DOMAIN	RFDOM EXP DT	datetime	Expiry date of a referenced domain. This date is mandatory and maintainable.	<None>

Table	Code	Data Type	Comment	Domain
REFERENCED DOMAIN	RFDOM VALCD CD	char(4)	Possible domain value for the referenced domain.	<None>
STANDARD SUBORDER	FF ACTR ID	int	ID of the Freight Forwarder Actor that created the Order, unique in the entire system.	<None>
STANDARD SUBORDER	FF PORT ID	int	ID of the Port of the Freight Forwarder that created the Order, unique in the entire system.	<None>
STANDARD SUBORDER	ORDR ID	numeric(9)	System-generated ID of the Order to Carrier, in the context of the Freight Forwarder that created it.	<None>
STANDARD SUBORDER	STDSUBORD CLIENT LOC	text	Free-form text in which the Freight Forwarder can enter details on the location of the client.	<None>
STANDARD SUBORDER	STDSUBORD CREAT DTTM	datetime	Date and time of the creation of the Standard Suborder information.	<None>
STANDARD SUBORDER	STDSUBORD CREAT USER	char(20)	User who created the Standard Suborder information.	<None>
STANDARD SUBORDER	STDSUBORD LINE NBR	int	System-generated ID of the Standard Suborder, in the context of a Standard Order to Carrier.	<None>
STANDARD SUBORDER	STDSUBORD MODIF DTTM	datetime	Date and time of the last modification made to the Standard Suborder information.	<None>
STANDARD SUBORDER	STDSUBORD MODIF USER	char(20)	Last user who modified the Standard Suborder information.	<None>
STANDARD SUBORDER	STDSUBORD NOTE	text	Free-form text in which the Freight Forwarder can enter specific instructions to the Carrier for a specific Unit.	<None>
STANDARD SUBORDER	STDSUBORD RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_ STAT
STANDARD SUBORDER	STDSUBORD RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>

Table	Code	Data Type	Comment	Domain
STANDARD SUBORDER	STDSUBORD STATUS	char(2)	Derived status of the current Standard Suborder.	D_ORDER_ STAT
STANDARD SUBORDER	UNIT BLDNG NBR	char(20)	ID of the Bill of Lading created by a Freight Forwarder, in the context of the Voyage. (provided by the Vessel Manifest).	<None>
STANDARD SUBORDER	UNIT INIT ID	char(4)	Initials of the Unit ID represented by the first four digits (e.g., CNRU in CNRU1234567).	<None>
STANDARD SUBORDER	UNIT NBR ID	char(7)	Numbers of the Unit ID represented by the last seven digits (e.g., 1234567 in CNRU1234567).	<None>
STANDARD SUBORDER	UNIT VYGE NBR	char(15)	Sequence number (provided by the Shipping Line) usually attached to the end of the Vessel name to identify a specific Voyage, in the context of a Vessel name.	<None>
STANDARD SUBORDER	UNIT VYGE VESSEL ID	char(30)	Name of the Vessel provided by the Shipping Line.	<None>
SUBINSTRUC-TION	FF ACTR ID	int	ID of the Freight Forwarder Actor that created the Order, unique in the entire system.	<None>
SUBINSTRUC-TION	FF PORT ID	int	ID of the Port of the Freight Forwarder that created the Order, unique in the entire system.	<None>
SUBINSTRUC-TION	INSTR ID	int	ID of the Instruction to Truck Driver, in the context of the Trucking Company that created it.	<None>
SUBINSTRUC-TION	ORDR ID	numeric(9)	ID of the Order to Carrier, in the context of the Freight Forwarder that created it.	<None>
SUBINSTRUC-TION	STDSUBORD LINE NBR	int	ID of the Standard Suborder Line, in the context of a Standard Order.	<None>
SUBINSTRUC-TION	SUBINSTR CREAT DTTM	datetime	Date and time of the creation of the Subinstruction information.	<None>
SUBINSTRUC-TION	SUBINSTR CREAT USER	char(20)	User who created the Subinstruction information.	<None>

Table	Code	Data Type	Comment	Domain
SUBINSTRUC-TION	SUBINSTR ID	int	System-generated ID of the Subinstruction, in the context of an Instruction to Truck Driver.	<None>
SUBINSTRUC-TION	SUBINSTR MODIF DTTM	datetime	Date and time of the most recent modification made to the Subinstruction information.	<None>
SUBINSTRUC-TION	SUBINSTR MODIF USER	char(20)	Last user who modified the Subinstruction information.	<None>
SUBINSTRUC-TION	SUBINSTR NOTE	text	Free-form text in which the Trucking Company can enter specific instructions to the Trcuk Driver for a specific Unit.	<None>
SUBINSTRUC-TION	SUBINSTR RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT
SUBINSTRUC-TION	SUBINSTR RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
SUBINSTRUC-TION	SUBINSTR STATUS	char(2)	Derived status of the Subinstruction line. For future use.	D_INSTR_STAT
SUBINSTRUC-TION	TK ACTR ID	int	ID of the Trucking Company Actor (in the context of a Port) that created the Instruction to Truck Driver, unique in the entire system.	<None>
SUBINSTRUC-TION	TK PORT ID	int	ID of the Port of the Trucking Company (in the context of a Port) that created the Instruction, unique in the entire system.	<None>
TRUCK DRIVER	DRVR CREAT DTTM	datetime	Date and time of the creation of the Truck Driver information.	<None>
TRUCK DRIVER	DRVR CREAT USER	char(20)	User who created the Truck Driver information.	<None>
TRUCK DRIVER	DRVR EMPLOYEE ID	char(10)	Employee number of the Truck Driver provided by the Trucking Company, in the context of the related Trucking Company.	<None>
TRUCK DRIVER	DRVR EXP DT	datetime	Date after which the Truck Driver is no longer active.	<None>

Table	Code	Data Type	Comment	Domain
TRUCK DRIVER	DRVR MODIF DTTM	datetime	Date and time of the most recent modification made to the Truck Driver information.	<None>
TRUCK DRIVER	DRVR MODIF USER	char(20)	Last user who modified the Truck Driver information.	<None>
TRUCK DRIVER	DRVR NAME	char(50)	Name of the Truck Driver.	<None>
TRUCK DRIVER	DRVR PICTURE REF	char(100)	The address (pointer) of the picture of the Trcuk Driver.	<None>
TRUCK DRIVER	DRVR TEMPORARILY INACTIVE	char(1)	Indicates whether a Truck Driver has been deactivated temporarily (e.g., while on vacation).	D_YESNO
TRUCK DRIVER	TK DRVR ACTR ID	int	ID of the Trucking Company Actor (in the context of a Port) that hired the Truck Driver, unique in the entire system.	<None>
TRUCK DRIVER	TK DRVR PORT ID	int	ID of the Port of the Trucking Company (in the context of a Port) that hired the Truck Driver, unique in the whole system.	<None>
UNIT SUMMARY	BLDNG NBR	char(20)	ID of the Bill of Lading created by a Freight Forwarder, in the context of the Voyage. The foreign key indicates the Bill of Lading related to this Unit.	<None>
UNIT SUMMARY	SL ACTR ID	int	ID of the Shipping Line Actor responsible for the Unit, in the context of the Shipping Line Port ID, unique in the entire system.	<None>
UNIT SUMMARY	SL PORT ID	int	ID of the Port of the Shipping Line responsible for the Unit, unique in the entire system.	<None>
UNIT SUMMARY	UNIT CANCEL IND	char(1)	Indicates whether a Unit Summary is cancelled. This field is automatically set to YES if the related Bill of Lading is cancelled.	D_YESNO
UNIT SUMMARY	UNIT CONTENT	text	Description of the contents of a Unit, according to the Bill of Lading.	<None>
UNIT SUMMARY	UNIT CREATION DTTM	datetime	Date and time of the creation of the Unit in the database.	<None>

Table	Code	Data Type	Comment	Domain
UNIT SUMMARY	UNIT CUSTOM CHECK LOCN	char(30)	Canadian city where the Unit will be processed by Customs.	<None>
UNIT SUMMARY	UNIT CUTOFF DT	datetime	In the Export process, the latest date on which the Unit can arrive at the Terminal to be put on board the Vessel.	<None>
UNIT SUMMARY	UNIT DANGER CLASS CD	int	Danger class code. Domain to be provided by the Port of Montreal.	D_DANGER_CLASS
UNIT SUMMARY	UNIT DANGER UN CD	int	Danger UN code. Domain to be provided by the Port of Montreal.	D_DANGER_UN
UNIT SUMMARY	UNIT EXPECTED CARRIER ID	int	The Bill of Lading often indicates which Carrier should be assigned to the Unit. However, it is possible that another Carrier could handle the Unit.	<None>
UNIT SUMMARY	UNIT GATE IN CD	char(1)	Code indicating whether the Unit was Gate-In at the Terminal (Y) [export], expected to be Gate-In (N) [export], or is not obliged to be Gate-In (-) [import]. The value is derived from the Unit's Actual Events.	D_YESNONA
UNIT SUMMARY	UNIT GATE OUT CD	char(1)	Code indicating whether the Unit was Gate-Out from the Terminal (Y) [import], expected to be Gate-Out (N) [import], or is not obliged to Gate-Out (-) [export]. The value is derived from the Unit's Actual Events.	D_YESNONA
UNIT SUMMARY	UNIT GRND CD	char(1)	Code indicating whether the Unit was Grounded at the Terminal (Y), not yet Grounded (N), or if the unit is not obliged to be Grounded (-) [i.e., if the unit comes from/goes to a Railway carrier, it is not always Grounded]. The value is derived from the Unit's Actual Events.	D_YESNONA
UNIT SUMMARY	UNIT GROSS WEIGHT	numeric(8,4)	Number representing the quantity of "d_weight_unit" of the Unit and its contents (i.e., total weight of the Unit).	<None>

Table	Code	Data Type	Comment	Domain
UNIT SUMMARY	UNIT IN BOND CD	char(1)	Set to Y if the unit is processed by Customs at the current Import Export Port.	D_YESNO
UNIT SUMMARY	UNIT INIT ID	char(4)	Initials of the Unit ID represented by the first four characters (e.g., CNRU in CNRU1234567).	<None>
UNIT SUMMARY	UNIT LENGTH	numeric(8,4)	Number representing the quantity of "d_lenght_unit" of the Unit (i.e., total length of the Unit).	<None>
UNIT SUMMARY	UNIT LENGTH UNITS	int	Code specifying the units (metres, feet) used when measuring the length of the Unit.	D_LNGTH_ UNITS
UNIT SUMMARY	UNIT LOADEMPTY CD	char(1)	Code indicating whether the Unit is loaded or empty.	D_LD_MTY
UNIT SUMMARY	UNIT MODIF DTTM	datetime	Date and time of the most recent modification made to the Unit information.	<None>
UNIT SUMMARY	UNIT MODIF USER	char(20)	Last user who modified the Unit information.	<None>
UNIT SUMMARY	UNIT NBR ID	char(7)	Numbers of the Unit ID represented by the last seven digits (e.g., 1234567 in CNRU1234567).	<None>
UNIT SUMMARY	UNIT ON SHIP CD	char(1)	Code indicating whether the Unit is On-Ship (Y) or not On-Ship (N). The value is derived from the Unit's Actual Events.	D_YESNO
UNIT SUMMARY	UNIT PLACE OF DELIVERY	text	Indications concerning the place of delivery.	<None>
UNIT SUMMARY	UNIT RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_ STAT
UNIT SUMMARY	UNIT RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
UNIT SUMMARY	UNIT RLAC CD	char(1)	Code indicating whether the Unit has been released by Agriculture Canada (Y), is being held by Agriculture Canada (N), or if it does not need to be released by	D_YESNONA

Table	Code	Data Type	Comment	Domain
			Agriculture Canada (-). The value is derived from the Unit's Actual Events.	
UNIT SUMMARY	UNIT RLCC CD	char(1)	Code indicating whether the unit has been released by Customs (Y), is being held by Customs (N), or if it does not need to be released by Customs (-). The value is derived from the Unit's Actual Events.	D_YESNONA
UNIT SUMMARY	UNIT RLSL CD	char(1)	Code indicating whether the unit has been released by the Shipping Line (Y) or is being held by the Shipping Line (N). The value is derived from the Unit's Actual Events.	D_YESNO
UNIT SUMMARY	UNIT RLTE CD	char(1)	Code indicating whether the Unit has been released by the Terminal (Y) or is being held by the Terminal (N). The value is derived from the Unit's Actual Events.	D_YESNO
UNIT SUMMARY	UNIT STORAGE DT	datetime	In the Import process, the date after which the unit will be charged additional fees to stay at the Terminal.	<None>
UNIT SUMMARY	UNIT TYPE	int	Code indicating what type of unit: Flat top, Open top, etc.	D_UNIT_TYPE
UNIT SUMMARY	UNIT USER NOTES	text	Free-form text containing pertinent information about the Unit.	<None>
UNIT SUMMARY	UNIT WEIGHT UNITS	int	Code specifying the units (kilograms, pounds) used when measuring the weight of the Unit.	D_WGHT_UNITS
UNIT SUMMARY	VYGE NBR	char(15)	Voyage number of the Vessel on the Bill of Lading related to the Unit.	<None>
UNIT SUMMARY	VYGE VESSEL ID	char(30)	Name of the Vessel on the Bill of Lading related to the Unit.	<None>
VALUE DESCRIPTION	RFDOM DOMAIN NAME	char(60)	Name of a domain referenced by attributes. For instance, d_unit_event is the domain restricting the possible values of the attribute actlevt cd.	<None>

Table	Code	Data Type	Comment	Domain
VALUE DESCRIPTION	RFDOM EFF DT	datetime	A referenced domain may change over time. Therefore, domains are identified by version, which is indicated by effective date.	<None>
VALUE DESCRIPTION	RFDOM VALCD CD	char(4)	A possible domain value for the referenced domain.	<None>
VALUE DESCRIPTION	VALDSC DESCRIPTION	char(60)	Description/definition of the current domain value, by language.	<None>
VALUE DESCRIPTION	VALDSC LANGUAGE CD	numeric(1)	The language of the description of the current domain value. The language is associated with the user who logged onto the Extranet (this information is stored in LDAP).	D_LANGUAGE
VOYAGE	SL ACTR ID	int	ID of the Shipping Line Actor responsible for the Voyage, in the context of the Shipping Line Port ID, unique in the entire system.	<None>
VOYAGE	SL PORT ID	int	ID of the Port of the Shipping Line responsible for the Voyage, unique in the entire system.	<None>
VOYAGE	TE ACTR ID	int	ID of the Terminal Actor related to the Voyage, in the context of the Terminal Port ID, unique in the entire system.	<None>
VOYAGE	TE PORT ID	int	ID of the Port of the Terminal related to the Voyage, unique in the entire system.	<None>
VOYAGE	VYGE ACTL DTTM IND	char(1)	Code that indicates whether the vyge expctdactl dt and vyge expctdactl tm contain the actual date and time (Y) or the expected date and time (N).	D_YESNO
VOYAGE	VYGE ACTLEXPCTD DTTM	datetime	Depends on the value of vyge impexp cd. If Export and set to N, it means Expected Departure date and time. If Import and set to N, it means Expected Arrival date and time. If Export and set to Y, it means Actual Departure	<None>

Table	Code	Data Type	Comment	Domain
			date and time If Import and set to Y, it means Actual Arrival date and time.	
VOYAGE	VYGE CANCEL DTTM	datetime	Date and time of the cancellation of the Voyage.	<None>
VOYAGE	VYGE CANCEL IND	char(1)	Indicates whether a Voyage has been cancelled.	D_YESNO
VOYAGE	VYGE CANCEL USER	char(20)	User who cancelled the Voyage. All Bills of Lading and Units' Actual Events related to this Voyage are cancelled at the same time.	<None>
VOYAGE	VYGE CREAT DTTM	datetime	Date and time of the creation of the Voyage information.	<None>
VOYAGE	VYGE CREAT USER	char(20)	User who created the Voyage information.	<None>
VOYAGE	VYGE IMPEXP CD	char(1)	Code indicating whether this is an import or export Voyage. For example, if a ship left Hamburg, berthed at Montreal, and went back to Hamburg: the first Voyage (Hamburg to Montreal) is Import; the second Voyage (Montreal to Hamburg) is Export.	D_IMPEXP
VOYAGE	VYGE MODIF DTTM	datetime	Date and time of the most recent modification made to the Voyage information.	<None>
VOYAGE	VYGE MODIF USER	char(20)	Last user who modified the Voyage information.	<None>
VOYAGE	VYGE NBR	char(15)	Sequence number (provided by the Shipping Line) usually attached to the end of the Vessel name to identify a specific Voyage, in the context of a Vessel name.	<None>
VOYAGE	VYGE NEXT PORT NAME	char(50)	Name of the next port at which the Voyage is scheduled to arrive.	<None>
VOYAGE	VYGE PREV PORT NAME	char(50)	Name of the previous port at which the Voyage stopped.	<None>
VOYAGE	VYGE RECORD STAT	char(1)	Field that indicates if a record is available (A) for current database operations such as queries and updates, or part of the history data (D).	D_RECORD_STAT

Table	Code	Data Type	Comment	Domain
VOYAGE	VYGE RECORD STAT DT	datetime	Field that indicates when a record became part of the history data (D). This date is mandatory when the Record status is D.	<None>
VOYAGE	VYGE SHIP BERTH	char(30)	Physical location (berth) of the Vessel at the Terminal.	<None>
VOYAGE	VYGE TOTAL NBR OF UNITS	int	The total number of Units aboard the Vessel for this Voyage (provided by the Shipping Line).	<None>
VOYAGE	VYGE VESSEL ID	char(30)	Name of the Vessel (provided by the Shipping Line).	<None>

Table 66 Table Columns List

4.3.3 Table Indexes List

Table	Code	Primary	Foreign Key	Unique	Alternate Key	Cluster
ACTOR	ACTOR LDAP UC	FALSE	FALSE	TRUE	FALSE	FALSE
ACTOR	ACTOR OPERATING AT PORT_FK	FALSE	FALSE	FALSE	FALSE	FALSE
ACTOR	ACTOR_PK	TRUE	FALSE	TRUE	FALSE	TRUE
ACTUAL EVENT	EVENT WAS CANCELLED_FK	FALSE	FALSE	FALSE	FALSE	FALSE
ACTUAL EVENT	STATUS_FK	FALSE	TRUE	FALSE	FALSE	FALSE
ACTUAL EVENT	_ACTUAL EVENT__PK	TRUE	FALSE	TRUE	FALSE	TRUE
BILL OF LADING	FOR IMPORTEXPORT_FK	FALSE	TRUE	FALSE	FALSE	FALSE
BILL OF LADING	HANDLES THESE BLS_FK	FALSE	TRUE	FALSE	FALSE	FALSE
BILL OF LADING	_BILL OF LADING__PK	TRUE	FALSE	TRUE	FALSE	TRUE
CANCEL INFO	_CANCEL INFO__PK	TRUE	FALSE	TRUE	FALSE	TRUE
CONTACT PERSON	HAS REPS_FK	FALSE	TRUE	FALSE	FALSE	FALSE
CONTACT PERSON	_CONTACT PERSON__PK	TRUE	FALSE	TRUE	FALSE	TRUE
INSTRUCTION TO TRUCK DRIVER	CREATED_FK	FALSE	TRUE	FALSE	FALSE	FALSE
INSTRUCTION TO TRUCK DRIVER	INSTR ASSIGNED TO_FK	FALSE	TRUE	FALSE	FALSE	FALSE
INSTRUCTION TO TRUCK DRIVER	_INSTRUCTION TO TRUCKER__PK	TRUE	FALSE	TRUE	FALSE	TRUE
NAME	MULTILINGUAL NAME_FK	FALSE	TRUE	FALSE	FALSE	FALSE
NAME	NAME_PK	TRUE	FALSE	TRUE	FALSE	TRUE
NAME SYNONYM	HAS ACTOR NAME SYNONYM_FK	FALSE	TRUE	FALSE	FALSE	FALSE
NAME SYNONYM	SYN EXPRESS UC	FALSE	FALSE	TRUE	FALSE	FALSE
NAME SYNONYM	_NAME SYNONYM__PK	TRUE	FALSE	TRUE	FALSE	TRUE
ORDER TO CARRIER	BILL OF LADING STANDARD ORDER_FK	FALSE	TRUE	FALSE	FALSE	FALSE
ORDER TO CARRIER	ORDER ASSIGNED TO_FK	FALSE	TRUE	FALSE	FALSE	FALSE

Table	Code	Primary	Foreign Key	Unique	Alter-nate Key	Cluster
ORDER TO CARRIER	PREPARES_FK	FALSE	TRUE	FALSE	FALSE	FALSE
ORDER TO CARRIER	TERMINAL CONCERNED BY THE ORDER_FK	FALSE	FALSE	FALSE	FALSE	FALSE
ORDER TO CARRIER	VOYAGE OF THE BOOKING NBR_FK	FALSE	TRUE	FALSE	FALSE	FALSE
ORDER TO CARRIER	_ORDER TO CARRIER__PK	TRUE	FALSE	TRUE	FALSE	TRUE
REFERENCED DOMAIN	_REFERENCED DOMAIN__PK	TRUE	FALSE	TRUE	FALSE	TRUE
STANDARD SUBORDER	INVOLVES UNIT_FK	FALSE	TRUE	FALSE	FALSE	FALSE
STANDARD SUBORDER	ORDER DETAIL PER UNIT_FK	FALSE	TRUE	FALSE	FALSE	FALSE
STANDARD SUBORDER	SUBORDER DRIVING THE SUBINSTRUCTION_FK	FALSE	FALSE	FALSE	FALSE	FALSE
STANDARD SUBORDER	_STANDARD SUBORDER__PK	TRUE	FALSE	TRUE	FALSE	TRUE
SUBINSTRUCTION	INSTRUCTION DETAIL BY UNIT_FK	FALSE	TRUE	FALSE	FALSE	FALSE
SUBINSTRUCTION	SUBINSTRUCTION_PK	TRUE	FALSE	TRUE	FALSE	TRUE
SUBINSTRUCTION	SUBORDER DRIVING THE SUBINSTRUCTION_FK	FALSE	TRUE	FALSE	FALSE	FALSE
TRUCK DRIVER	MANAGES_FK	FALSE	TRUE	FALSE	FALSE	FALSE
TRUCK DRIVER	_TRUCK DRIVER__PK	TRUE	FALSE	TRUE	FALSE	FALSE
UNIT SUMMARY	INVOLVES UNIT_FK	FALSE	FALSE	FALSE	FALSE	FALSE
UNIT SUMMARY	REFERS TO_FK	FALSE	TRUE	FALSE	FALSE	FALSE
UNIT SUMMARY	UNIT SPONSOR_FK	FALSE	TRUE	FALSE	FALSE	FALSE
UNIT SUMMARY	_UNIT SUMMARY__PK	TRUE	FALSE	TRUE	FALSE	TRUE
VALUE DESCRIPTION	MULTILINGUAL DESC_FK	FALSE	TRUE	FALSE	FALSE	FALSE
VALUE DESCRIPTION	_VALUE DESCRIPTION__PK	TRUE	FALSE	TRUE	FALSE	FALSE
VOYAGE	OPERATES_FK	FALSE	TRUE	FALSE	FALSE	FALSE

Table	Code	Primary	Foreign Key	Unique	Alter-nate Key	Cluster
VOYAGE	VOYAGE STOPS AT TERMINAL_FK	FALSE	TRUE	FALSE	FALSE	FALSE
VOYAGE	VOYAGE_PK	TRUE	FALSE	TRUE	FALSE	TRUE

Table 67 Table Indexes List

4.3.4 Reference List

Parent Table	Child Table	Code	Foreign key constraint name	Cardi-nality
ACTOR	BILL OF LADING	HANDLES THESE BLS	FK_BILL OF_ HANDLES T_ACTOR	0..*
ACTOR	CONTACT PERSON	HAS REPS	FK_CONTACT _HAS REPS_ACTOR	1..*
ACTOR	INSTRUCTION TO TRUCK DRIVER	CREATED	FK_INSTRUCT_ CREATED_ACTOR	0..*
ACTOR	NAME	MULTILINGUAL NAME	FK_NAME_ MULTILING_ACTOR	1..*
ACTOR	NAME SYNONYM	HAS ACTOR NAME SYNONYM	FK_NAME SYN_HAS ACTOR_ACTOR	1..*
ACTOR	ORDER TO CARRIER	ORDER ASSIGNED TO	FK_ORDER TO_ ORDER ASS_ACTOR	0..*
ACTOR	ORDER TO CARRIER	PREPARES	FK_ORDER TO_ PREPARES_ACTOR	0..*
ACTOR	TRUCK DRIVER	MANAGES	FK_TRUCK DR_ MANAGES_ACTOR	0..*
ACTOR	UNIT SUMMARY	UNIT SPONSOR	FK_UNIT SUM_UNIT SPON_ACTOR	0..*
ACTOR	VOYAGE	OPERATES	FK_VOYAGE_ OPERATES_ACTOR	0..*
ACTOR	VOYAGE	VOYAGE STOPS AT TERMINAL	FK_VOYAGE_ VOYAGE ST_ACTOR	0..*
ACTUAL EVENT	CANCEL INFO	EVENT WAS CANCELLED	FK_CANCEL I_EVENT WAS_ACTUAL E	0..1
BILL OF LADING	ORDER TO CARRIER	BILL OF LADING STANDARD ORDER	FK_ORDER TO_BILL OF L_BILL OF	0..*
BILL OF LADING	UNIT SUMMARY	REFERS TO	FK_UNIT SUM_ REFERS TO_BILL OF	0..*

Parent Table	Child Table	Code	Foreign key constraint name	Cardi-nality
INSTRUCTION TO TRUCK DRIVER	SUBINSTRUCTION	INSTRUCTION DETAIL BY UNIT	FK_SUBINSTR_ INSTRUCTI_ INSTRUCT	1..*
ORDER TO CARRIER	STANDARD SUBORDER	ORDER DETAIL PER UNIT	FK_STANDARD_ ORDER DET_ORDER TO	0..*
REFERENCED DOMAIN	VALUE DESCRIPTION	MULTILINGUAL DESC	FK_VALUE DE_MULTILING_ REFERENC	1..*
STANDARD SUBORDER	SUBINSTRUCTION	SUBORDER DRIVING THE SUBINSTRUCTION	FK_SUBINSTR_ SUBORDER _STANDARD	0..1
TRUCK DRIVER	INSTRUCTION TO TRUCK DRIVER	INSTR ASSIGNED TO	FK_INSTRUCT_ INSTR ASS_TRUCK DR	0..*
UNIT SUMMARY	ACTUAL EVENT	STATUS	FK_ACTUAL E_STATUS_UNIT SUM	1..*
UNIT SUMMARY	STANDARD SUBORDER	INVOLVES UNIT	FK_STANDARD_ INVOLVES _UNIT SUM	0..1
VOYAGE	BILL OF LADING	FOR IMPORTEXPORT	FK_BILL OF _FOR IMPOR_VOYAGE	0..*
VOYAGE	ORDER TO CARRIER	VOYAGE OF THE BOOKING NBR	FK_ORDER TO_VOYAGE OF_VOYAGE	0..*

Table 68 Reference List

4.3.5 Domain List

Name	Data Type	Man-datory	Comment
d_actr_role	char(2)	TRUE	Value indicating the role of the current ACTOR. Allowed values: PO - Port TE - Port Terminal SL - Shipping Line FF - Freight Forwarder TK - Carrier (Trucking company) RR - Carrier (Railway company)
d_cancel_rsn	int	TRUE	The values must be determined with the users.
d_danger_UN	int	FALSE	The values must be provided by the users.

Name	Data Type	Man-datory	Comment
d_danger_class	int	FALSE	The values must be provided by the users.
d_impexp	char(1)	TRUE	Allowed values: E - Export I - Import
d_in_out_gate	char(1)	TRUE	Code indicating if an empty unit order concerns IN-GATE moves (delivery to the Terminal) or OUT-GATE moves (pickup from the Terminal): I - In-Gate O - Out-Gate
d_instr_stat	char(2)	FALSE	The value of this domain is applicable according to the context established. When the instruction is created, it receives an ASsigned status. When it is completed (each of the involved units were processed by the Truck Driver), it receives an EXecuted status. The fields referencing this domain are derived. AS - Assigned EX - Executed AN - Cancelled
d_language	numeric(1)	TRUE	Languages in which a user can define a name. For instance, the English name of a Port actor is Port of Montreal, while its French name is Port de Montréal. Allowed values: <1> English <2> French
d_ld_mty	char(1)	TRUE	Allowed values: E - Empty L - Loaded U - Unknown
d_lngth_units	int	FALSE	Allowed values: <1> metres <2> feet
d_order_stat	char(2)	FALSE	The value of this domain is applicable according to the context established. When the order is created, it receives an ASsigned status. When it is completed (each of the involved units were processed by the Carrier), it receives an EXecuted status. The fields referencing this domain are derived. AS - Assigned EX - Executed AN - Cancelled
d_ordr_type	char(1)	TRUE	Allowed values: F - Free-Form S - Standard

Name	Data Type	Man-datory	Comment
d_record_stat	char(1)	FALSE	Allowed values: A - Available for current database operations H - Semi-archived data
d_unit_event	char(4)	TRUE	Allowed values: RLCC - Release by Canada Customs RLAC - Release by Agriculture Canada RLSL - Release by Shipping Line RLTE - Release by Terminal HDCC - Hold by Canada Customs HDAC - Hold by Agriculture Canada HDSL - Hold by Shipping Line HDTE- Hold by Terminal RICC - Inspection by Canada Customs RIAC - Inspection by Agriculture Canada OSSL - Ship at Sea APSL - Ship in Port OAFF - Order Assigned IATK - Instruction Assigned OFTE - Off board ONSL - On board IGTE - In-Gate at Terminal OGTE - Out-Gate from Terminal OKTE - Ready to be picked up RPRR - Ramped on Train DRRR - Deramped from Train IRTE - Rejected at In-Gate ORTE - Rejected at Out-Gate BOTE - Bad order GRTE - Grounded in Terminal Yard TTFF - Transiting to Terminal
d_unit_type	int	TRUE	This list must be completed with the users Allowed values: <1> Open Top <2> Flat <3> High cube <4> Reefer
d_wght_units	int	FALSE	Allowed values: <1> kg <2> metric tons <3> lb <4> tons
d_yesno	char(1)	TRUE	Allowed values Y - Yes N - No
d_yesnona	char(1)	TRUE	Allowed values: Y - Yes N - No - - Not applicable

Table 69 Domain List

4.3.6 Business Rule List

Code	Name	Comment
OP_ACTLEVT_1	RLCC event	The RLCC (Customs release) sent to the Terminal may concern only part of a unit. As details of the unit's contents are not available, the RLCC event will be handled manually at the Terminal.
OP_ACTR_1	Alerts sent to Actor	If a general e-mail address is set for the Actor, this address is automatically set to receive alerts.
OP_ACTR_2	Data access filtering	Access to database records will be limited according to the current Actor record characteristics. Thus, a given Freight Forwarder can only access the information explicitly related to itself. Also, a Terminal can only access information that explicitly concerns itself and cannot access any information concerning other Terminals.
OP_ACTR_3	Uniqueness criteria	'actr ldap actr id' is unique among all the Actors of the Extranet. It is a Foreign Key to the LDAP (which controls access to the Extranet).
OP_ALERT_1	Alerts vs. actor and contacts	An Alert is targeted to an Actor and one of its Contact Perons. The Port should be considered as an Actor; it follows the same rules.
OP_ALERT_2	Alerts creation	Alerts are created by the Extranet application each time a cancellation or modification occurs on a Voyage, Bill of Lading, Booking, Order, or Instruction.
OP_BLDNG_1	Bill of Lading creation	The Bill of Lading is created when the Vessel Manifest is "translated" and sent to the Extranet database. The attached units are created at the same time.
OP_BLDNG_2	Bill of Lading cancellation	When a Bill of Lading is cancelled by the Shipping Line, that Bill of Lading and its dependents must be removed from the database and archived.
OP_CNCLINF_1	Cancel cannot be undone	It is not possible to cancel an event that has already been cancelled. To retrieve the corresponding event, a new event must be created.
OP_CNCLINF_2	Event cancellation	Alerts must be sent to the Terminal, Shipping Line, Freight Forwarder, and Carrier.
OP_CNTCT_1	Alerts sent to contact	A maximum of one Contact Person - among the contacts attached to a given Actor - can be set as an e-mail alert recipient.
OP_FREEORDR_1	Free form order cancelled	An Alert must be sent to the assigned Carrier.
OP_FREEORDR_2	Booking requested to pick up empties	A Booking is requested each time a Free-Form Order is produced to pick up empty units from the terminal.

Code	Name	Comment
OP_ORDR_1	Mutually excl order type	The Freight Forwarder must choose between two different types of orders: Free-Form or Standard. A Standard order is used if and only if a Unit Summary and its corresponding Bill of Lading exist in the Extranet database. Otherwise, the Freight Forwarder must use a Free-Form Order.
OP_ORDR_2	Order reassignment	If an Order is reassigned to another Carrier, an Alert must be sent to the previously assigned Carrier.
OP_PORT_1	Alerts sent to Port	If a general e-mail address is set for the Port, this address is automatically set to receive alerts.
OP_STDSUBORD_1	Standard Suborder cancellation	An Alert must be sent to the assigned Carrier.
OP_STDSUBORD_2	Order status derived	Status is assigned at creation. It is 'cancelled' if the Freight Forwarder cancels the order. It is 'executed' if all related instructions have been executed.
OP_SUBALERT_1	Subalert	A subalert may concern an entire Bill of Lading, a Booking, a Standard Order, or a Standard Instruction. The context is specified in the Subalert description.
OP_UNIT_1	Unit creation	The Unit Summary is created at the same time as the Bill of Lading.
OP_VYGE_1	Voyage cancellation	1) Voyage and its dependents are archived and removed from the database; 2) A 'Voyage cancelled' Alert is sent to the Port, Terminal, Shipping Line, and all the Carriers and Freight Forwarders servicing the Port.
OP_VYGE_2	Voyage creation	A Voyage is created as the first mandatory step of the Vessel Manifest. The Vessel Manifest may not contain any Bills of Lading, resulting in the creation of the Voyage only. This will occur in export situations.

Table 70 Business Rule List

5 SECURITY

Windows NT environments are constantly evolving as new applications and users are added. With these new users, applications, and deployments also come new threats. In response to these threats, new Hot Fixes and Service Packs emerge as new versions are released. Hence, no prescription for setting up a secure environment can claim to be a comprehensive and timeless formula for absolute safety.

Security always comes with a price tag, whether for equipment, redundancy, software, manpower, research, training, or ease of use. In all cases, security is intended for the protection of assets, where assets are defined as **anything with value**. Building a secure web application for something that has no value is probably not worth the cost and effort of securing it.

Some assets are tangible and have a well-established monetary value, while others are intangible but still valuable. For example, inventory and furniture have a concrete value, but certain intangibles, such as a company's reputation, confidential source codes, privacy of data, ideas, and business plans are also important and have value.

It is hard to determine the value of intangible assets since it may vary widely from one owner to another. Security is a multifaceted discipline that involves decisions regarding the value of assets, which assets to protect, how to go about protecting them (what methods to use), and what technologies to use. All of this must be tempered with business rationale because deploying security for the sake of using the latest technology is simply unsound business practice.

5.1 Security Design Process

The first step in defining adequate security is to look at the high-level business requirements. Once the business requirements have been identified, information is needed to fulfil these requirements. Associated risks and threats are defined according to this information as well as its value. The higher the value of the information, the higher the protection will be. All security measures are translated into Security Policies, which are then implemented through services and programs using technology. As illustrated in Figure 31, security is a continual cycle, since business needs and technology are always changing.

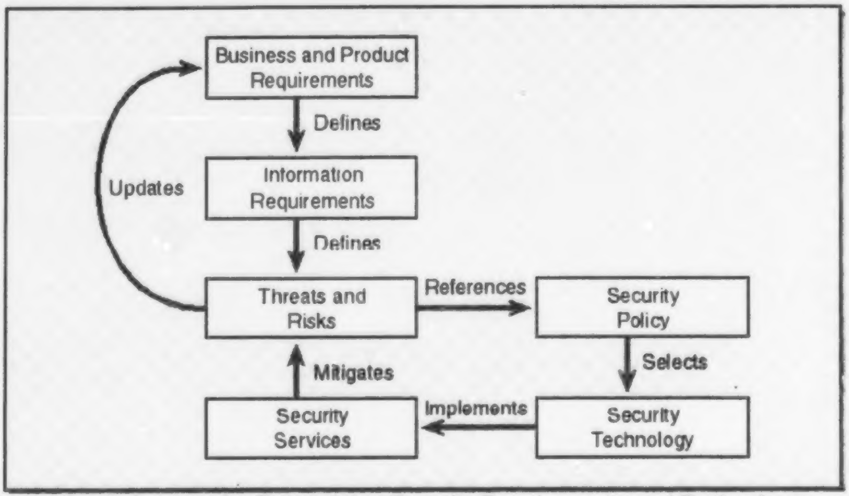


Figure 31 Cyclic Process for Determining Security Requirements and Technology

5.1.1 Business and Product Requirements

At the beginning of the project, a working committee was formed to establish how the Extranet should work. Several Port of Montreal stakeholder were interviewed by the committee to collect information on their business processes, their documentation procedures and, most importantly, their expectations regarding the Extranet.

Using this information, the following business and product requirements for the Extranet were determined:

- The Extranet must be the central repository for all stakeholders in regard to container status;
- The stakeholders will supply the Extranet and not the other way around (for security reasons, no data from the Extranet will allow updates from Shipping Lines, Freight Forwarders or Terminal systems.);
- The various stakeholders responsible for supplying information to the Extranet are expected to collect that information and/or adjust their own proprietary systems to supply the required information;
- The accepted formats to receive data from the various stakeholders will be XML (preferred), EDI, and flat files (FTP);
- Facilities will be provided for smaller companies like Freight Forwarders and Trucking Companies to exchange information on the Extranet via batch load and on-line screens;

- All container status information will be accumulated by the various Terminals and then forwarded to the Extranet on a individual container basis;
- The Extranet will provide to all stakeholders on-line status of all containers that transit (Import/Export) the Port of Montreal via Trucking Companies only (Phase I), in order to significantly reduce the number of telephone requests for container status;
- All authorized stakeholders must be able to access the Extranet easily using minimal technology (Web Browser, Single Sign On, and an Internet connection);
- Only the information specific to a stakeholder will be accessible by that stakeholder. The information displayed will be filtered to show only data relevant to that specific stakeholder based on an authentication and authorization process;
- Certain stakeholders such as Canada Customs, Agriculture Canada, and the Port of Montreal will have read-only access to the database and will use the Extranet for report purposes only;
- Carriers will be able to download information from the Extranet using a standard format layout to avoid having to re-enter information to prepare internal work orders;
- A database of Truck Drivers will be supported in the Extranet and maintained by the Trucking Companies to allow photo identification of the Truck Driver at the Terminal gate;
- Extranet membership will be free for every stakeholder that wishes to participate;
- All user accounts will be managed from a single database;
- The subscription process will be validated and authorized by a committee formed by Port of Montreal representatives to ensure legitimate membership;
- Facilities will be provided to stakeholders for registration and support. A Business Office and Help Desk (fully bilingual) with a toll-free number will be part of the Extranet;
- The current proposed solution must be designed to allow the Port of Montreal to fully implement the solution on its own premises;
- The infrastructure will have a distinct environment for development and production;
- The design of the solution must be able to accommodate future enhancements and functions, such as managing Containers transported by railway companies, digital certificates, graphic display of equipment, maps, and video streams;
- The overall availability of the system must be equal to or greater than 98.5%;
- The only downtime permitted for the Extranet will be at night, and it must be scheduled in advance;
- The database for reports will contain at least 13 months of data and will not interfere with the performance of the current operation;
- The web site will provide information on the purpose of the Extranet and how to register;
- The Extranet must support a multilingual approach.

5.1.2 Information Requirements

Based on the business requirements, a functional design was created to validate the requirements and constraints based on the information needed to construct the model. From there, all the required information was able to be defined. Please see section 4 for a complete view of the design and information requirements for the solution.

5.1.3 Threats and Risks

A threat is a possibility that poses a danger to a business asset. Threats are evaluated in the context of business risks: the greater the impact on the business, the greater the threat. The first thing that must be done is to establish the Extranet's risk tolerance by classifying that tolerance according to possible threats. The STRIDE model will be used to help evaluate each threat and associated tolerance risk.

Essentially, the STRIDE model measures possible family threats to the Extranet and classifies the risk based on a ratio comprised of two components:

- Criticality: the overall importance of the resource being protected;
- Effort: the degree of difficulty required to mount an attack on the resource.

For example, information regarding the contents of a Unit is critical. On a scale of one to ten, it scores a ten.

The effort needed to mount an attack to gain access to this information is relatively great if proper measures are put in place such as firewalls, regular patches on the Web, and delegation of authority forcing authentication at each point. On a scale of one to ten, it scores an eight.

The final ratio would be 1.25 (10 / 8), which means this resource is relatively safe.

5.1.4 Analysis of Possible Threats for POM Extranet

Spoofing user identity

Spoofing user identity means impersonating a valid system user or resource to gain access to the system. It generally happens when users write down their usernames and passwords and leave them where they are accessible to a lot of people. This threat is considered extremely critical because it results in the following:

- Unauthorized access to confidential information (information disclosure);
- Damage to the reputation of the security of the system;
- Tampering with data.

Ratio: This threat is evaluated as a level 5 (high) risk.

Tampering with data

Tampering with data involves the malicious modification of system or user data with or without detection. This kind of threat is one of the worst if undetected, and may result in serious damage. On the other hand, the feasibility is relatively low if the servers are well-maintained and spoofing user identity is prevented.

Ratio: This threat is evaluated as a level 2 risk.

Repudiation

Repudiation threats are associated with malicious users who can deny performing an action without the administration being able to prove otherwise. An example of a repudiation threat is a user performing an illegal operation in a system that lacks the ability to trace such operations. Although the current phase of the Port of Montreal Extranet does not use personal user digital certificates (X.509) to ensure formal non-repudiation, its design and choice of technology are capable of supporting this function, which will be implemented in a future phase with very few adjustments. Non-repudiation will be assumed in the current phase by the use of centralized protected logs and time synchronization of all servers.

Ratio: This threat is evaluated as a level 2 risk.

Information disclosure
Information disclosure can be very costly for the Port of Montreal Extranet because it calls into question all security around the system. Disclosing information without leaving a trace is very difficult, so the overall risk is low.

Ratio: This threat is evaluated as a level 2 risk.

Denial of service
A Denial of Service (DoS) threat arises when a valid user is denied the use of the system. For example, this could be done by making the system temporarily unavailable or unusable (request overload) or by forcing the user's machine or servers to reboot or restart. This kind of threat is often a last resort for hackers who couldn't do anything else. It may also be used in combination with another attack (session hacking). In all cases, if the servers are well-maintained, it is relatively difficult to perform without detection or countermeasures.

Ratio: This threat is evaluated as a level 2 risk.

Elevation of privilege
Elevation of privilege is usually the ultimate goal of hackers. Essentially, the hacker tries to gain full control of the system by getting the same privileges as a Root or administrator. This kind of threat on a well-maintained system requires either very extensive knowledge of a particular system's vulnerability (unknown to most people), or collaboration from the inside. In both cases, this gives the hacker the power to destroy all data. Elevation of privilege is very difficult on well-maintained severs.

Ratio: This threat is evaluated as a level 1 risk.

5.1.5 Security Policy

Security policy is established and defined by the corporation that owns the system and the data. This document is used to define access policies, rights, security measures, procedures, countermeasures, and handling of intrusion.

The definition of a security policy document specific for the Port of Montreal Extranet is outside the scope of the current document; however, to be able to define security technology and services, a standard security policy designed for a similar BCE Emergis service was used in accordance with the Port of Montreal Extranet Service Level Agreement (SLA), the risks and threats to the system, and the estimated budget allowed for the solution.

5.1.6 Security Technology and Services

New security technologies are developed every day that promise much. They often deliver what they promised, but only cover a portion of the system's security. The challenge when choosing security technology is to find the right combination to achieve:

- **Equilibrium**: the right protection for all components;
- **Heterogeneity and integration**: a variety of technologies that ensure a wide range of protection against hackers, work well together, and communicate with each other;
- **Ease of use**: easy to install and manage for the administrator and, most importantly, the end user;

- **Monitoring and proactive response**: technology that sends alerts when a problem occurs and that is capable of launching a countermeasure or fix;
- **Sufficient support:** technology supported by back-end engineers and research teams to monitor emerging threats;
- **Availability of certified resources:** to ensure independence and access to quality resources;
- **Cost-effectiveness:** not only in terms of acquisition, but also in terms of manpower and equipment.

Many platforms like Sun, HP, and Compaq, or operating systems such as Solaris, HP UNIX, and Windows, as well as their relative applications (Web, databases, Com+ components) offer standard solutions for security. All have been subjected to extensive laboratory testing against threats, which makes it very difficult to compete with these giants when trying to offer or develop better solutions. This is why it is wise to use pre-developed integrated security technologies as much as possible when developing an application.

5.1.7 Golden Rules in Security

Regardless of technology, some golden rules have been established to ensure optimal security when developing an application.

Authentication

Authentication is the process of verifying the credentials of an entity before letting that entity access your resources. An entity can be a user, a service, or a server. The strength of the authentication is based on the validity and trustworthiness of the credentials presented.

In the case of the Port of Montreal Extranet, it is recommended to use several authentication processes depending on who the user is (regular user or service user, such as a batch or administrative user). See section 5.2 for more details.

Authorization

Once authentication is complete, the entity will want to access resources. The authorization process is used to determine which resources can be accessed by that entity. There are many degrees of access:

- **Access Control List (ACL):** describes the access capability of an entity for a resource (e.g., read, write, execute);
- **Privileges**: consist of a combination of rights and permissions affecting an entire computer rather than just an object, user, or resource. Priviliges are defined in the computer security policy. Examples include being able to logon as a batch on the computer, or being denied access to the computer at night (from 11 p.m. to 6 a.m.);
- **Permissions/rights:** permissions are actions allowed to be done on resources by a given user. Permissions and rights are related to users and groups;
- **Role checking in a COM+ component:** the ability to determine with a program whether an entity can perform a given action (such as accessing Unit contents, deleting a Voyage, or assigning Ccarrier). The decision is based on the authentication process and the predefined role of the entity, such as Freight Forwarder, Shipping Line, or Carrier.

In the case of the Port of Montreal Extranet, we recommend using a combination of all of these authorization accesses, which are built-in features or native practices within the operating system.

Auditing (logging)

The purpose of auditing is to gather information on successful or failed accesses by an entity to an object, or on the use of privileges for subsequent analysis. It is an important tool for debugging and understanding how system resources are being used.

Privacy (confidentiality)

Privacy is the protection of information against prying eyes and requires the use of encryption.

Integrity

Integrity is the protection of data against tampering (e.g., against malicious or accidental changes, including deletion).

Availability

Availability ensures that legitimate users are not denied access to system resources.

Non-repudiation

Non-repudiation is a technique used to provide proof that an action has occurred so that the user who performed the action may not refute it. Non-repudiation involves several processes including authentication, authorization, auditing, and integrity. In addition, the user must be informed that the actions about to be performed are legally binding.

5.2 Recommended Security Measures

This section proposes different security technologies as well as the best practices that could be used by the Port of Montreal Extranet against possible threats. These measures address the security of the physical system.

5.2.1 Best Practice Against Threats

Spoofing user identity
A strong authentication is the best practice to protect the system against spoofing user identity. Due to business requirement restrictions on the minimal use of technology, a strong password strategy is a good replacement for digital certificates, and Kerberos can be used for regular user authentication.

Tampering with data
A good strategy to prevent tampering with data is the use of strong access control mechanisms whereby the data accessed is validated with the authorization process. The use of encryption is mandatory to protect the data against changes.

Repudiation
To meet business requirements, client digital certificates are not used in this phase. The system will rely on authentication, authorization, auditing, integrity, and a legal notice to assure non-repudiation.

Information disclosure
Strong access control mechanisms, encryption, and a forced password policy are the best practices to prevent information disclosure. The use of delegation along the entire access chain will also ensure restricted data access.

Denial of service
Monitoring, packet filtering, and well-maintained servers (patches and fixes) are the best practices to prevent denial of service. The use of separate development and production environments will ensure no back-door password and no violation of security policy.

Elevation of privilege
When developing an application, 'program calls' in the production application must always use non-administrator and non-local-system accounts. The use of restricted token and delegation is a very good practice to achieve this. A complete test strategy of the application, analysis of function call, use of com+ checking role, and size of buffers are further mandatory steps to protect the system against elevation of privilege.

5.2.2 Recommended Technology

Figure 32 represents a simplified version of the physical security model of the proposed application and does not illustrate all the details regarding the infrastructure covered section 2. It focusses instead on the software recommended to put together a secure solution that meets the business requirements.

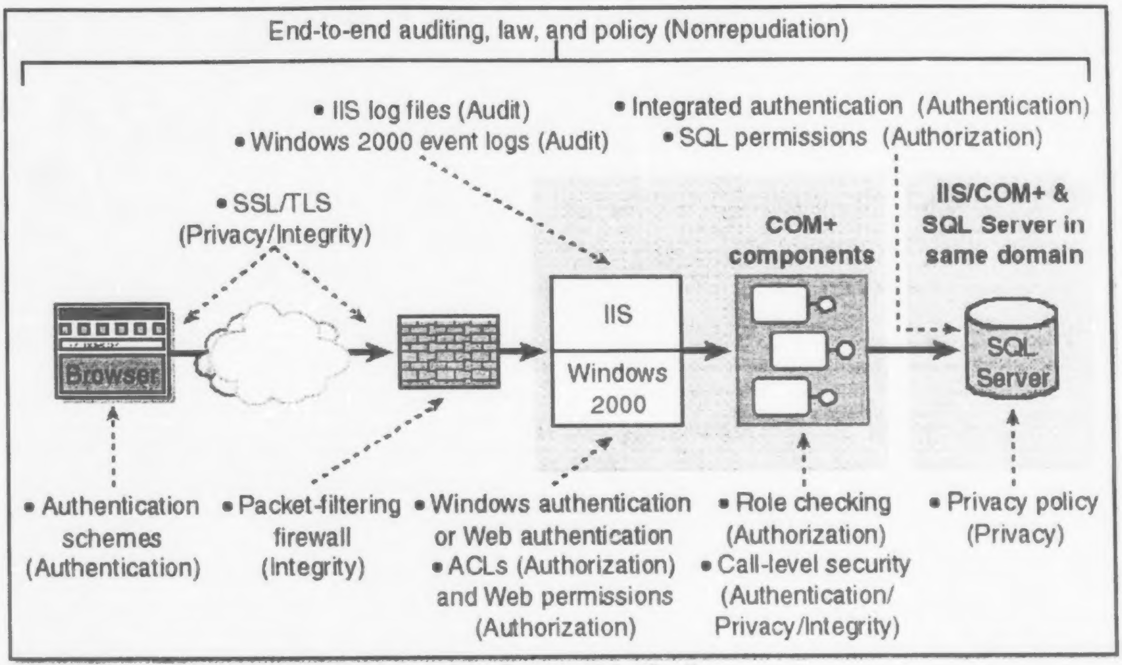

End-to-end auditing, law, and policy (Nonrepudiation)
• IIS log files (Audit)
• Windows 2000 event logs (Audit)
• Integrated authentication (Authentication)
• SQL permissions (Authorization)
• SSL/TLS (Privacy/Integrity)
COM+ components
IIS/COM+ & SQL Server in same domain
Browser
IIS
Windows 2000
SQL Server
• Authentication schemes (Authentication)
• Packet-filtering firewall (Integrity)
• Windows authentication or Web authentication
• ACLs (Authorization) and Web permissions (Authorization)
• Role checking (Authorization)
• Call-level security (Authentication/ Privacy/Integrity)
• Privacy policy (Privacy)

Figure 32 Physical Security Model of the Proposed Application

Windows 2000 Server and Advanced Server edition

The Windows 2000 Server includes improved network, application, and Web services, as well as increased reliability and scalability. One of the most important additions is improved security technology such as public key infrastructure, Kerberos authentication, IP Security, and an Active Server Directory.

IIS 5 runs as a service on the Windows 2000 Server and leverages many of the security technologies in Windows 2000 (such as ACLs) and Windows 2000 authentication (such as Windows NT Challenge/Response authentication [NTLM] and Kerberos).

Windows 2000 will be used on all servers to have a complete native Domain in conjunction with the ASD, and all servers within the Extranet solution will authenticate each other using Kerberos. Business requirements do not require Client Certificate (X.509), but this platform will be able to support it in a future enhancement.

Internet Explorer 5.0 on the client side

Internet Explorer 5.0 is the Web browsing technology provided in Windows 2000. It includes support for many security technologies, including digest, Kerberos authentication, and SSL/TLS.

SSL/TLS will be used between the browser and the Web server for the entire web site portion that requires authentication. The standard authentication method for all regular users will be Basic authentication in combination with SSL/TLS. Anonymous authentication will be used for the portions of the web site dedicated to information purposes such as FAQ, How to Register, and Extranet Objectives.

It is a common misconception that using Basic authentication over SSL/TLS still yields some of the HTTP headers in clear text and that Basic authentication occurs before SSL/TLS is used to encrypt the connection. This is incorrect. When IIS is configured to use any authentication scheme in conjunction with SSL/TLS, the SSL/TLS negotiation takes place first and the secure channel is established, after which authentication occurs. With the channel is now encrypted, the authentication data is secure, including the Basic authentication header information.

Basic authentication for all regular users was selected mainly because it is secure with SSL/TLS, is very simple to operate, supports delegation for all servers, and goes through firewalls and proxies.

A simple customization should be done with the Window Logon process to display the last date of Valid Logon. With this feature, a user may discover that someone is trying to gain unauthorized access using that user's ID and password. If users notify the system administrator of abnormal situations, spoofing attempts may be detected.

For the Administrator who wants to connect to the Extranet, Windows 2000 Professional or better is required to use Integrated Windows authentication (Kerberos) and all the tools to perform Extranet administration functions.

A Schedule Authentication presented in section 5.4 to highlight the functions of Basic authentication and Integrated Windows authentication.

Internet Information Services 5 (IIS 5.0)

IIS 5.0 is proposed for Kerberos functionality. It hosts a number of Active Server Pages (ASP) that call COM+ components. Most of the user interface layout is provided by ASP as it generates HTML (or dynamic HTML). The permissions wizard and Server Certificate wizard are improved features that are very simple to use.

COM+ components

COM+ components will perform most, if not all, of the business rules components and work as well as the query SQL Server by using Active Data Objects. ADOs provide a high-level, flexible interface to various databases such as the SQL Server.

COM+ is language-neutral, but the components should be created using Microsoft Visual Basic 6, which is a high-level rapid application development (RAD) tool for creating applications and COM+ components. Its speed of development and execution, as well as its excellent debugging capability make it an excellent choice. VB 6 was also chosen because many third-party companies support it, because it is one of the most popular development tools, and because certified resources are easy to find.

SQL Server 2000

The SQL Server provides integrated security with the Windows 2000 operating system. It supports the use of all available security protocols and provides authentication for each user.

The SQL Server will store all Port of Montreal Extranet data and, like IIS, it will run as a service on top of Windows 2000. The integrated authentication is recommended to comply with the business requirement stipulating that only one database of users will be used (Active Server Directory).

5.3 Active Server Directory 2000

5.3.1 Directory Overview

A directory service provides a place to store information about network-based entities, such as applications, files, printers, and people. It provides a consistent way to name, describe, locate, access, manage, and secure information about these individual resources.

A directory service is one of the most important components of an extended computer system because it:

- **Simplifies management** by providing a single and consistent point of management for users, applications, and devices;
- **Strengthens security** by providing users with a single sign-on to network resources and supplying administrators with powerful and consistent tools to manage security services for internal desktop users, remote dial-up users, and external e-commerce customers;
- **Extends interoperability** by providing standards-based access to all Active Directory features, as well as synchronization support for popular directories.

The Port of Montreal Extranet architecture is based on Windows 2000. To have a fully integrated solution, the directory product must be an Active Directory, which means an integrated set of directory services that improve the management, security, and interoperability of the Windows network operating system.

Hierarchical Organization
The Active Server Directory uses objects to represent network resources such as users, groups, machines, devices, and applications. It uses containers to represent organizations (such as the marketing department), or collections of related objects (such as printers). It organizes information in a tree structure made up of these objects and containers, similar to the way the Windows operating system uses folders and files to organize information on a computer.

5.3.2 Port of Montreal Directory Requirements

The Port of Montreal Extranet requires a directory to keep security information on all users that may access the Extranet. More specifically, a directory is needed to:

- keep information to authenticate Extranet users;
- use delegation for the different processes that manage the Extranet (authentication and authorization for each step, such as Web, Com+, and database);
- use SSO (Single sign on);
- provide information integrity and privacy;
- centralize information related to users, groups of users, and permissions;
- allow future use of certificates.

5.3.3 Directory Design

In the Active Server Directory, the core unit of logical structure is the domain. The first step in the directory design is to identify all domains required. Domains may be grouped logically in forests.

The Port of Montreal Extranet is a small infrastructure with few users (around 300); therefore, there is no need to define more than one domain. Within the Active Directory, one domain can span multiple sites and contain millions of objects.

The best practice for Active Directory design is to map the Internet domain with the root of the directory. For the Port of Montreal, the Internet domain is **PORTMTL.COM**.

The next step is to create a hierarchy of Organizational Units (OUs) for the domain. To be efficient, the OU structure must organize users and resources by using a hierarchy of OUs that reflects the structure of the Port of Montreal community.

The design presented here regroups objects according to the types of stakeholders that will be part of the Port of Montreal Extranet. The Administration branch is required to keep information for system administrators. "General Users" is a branch that groups stakeholders with no specific requirements, such as government agencies.

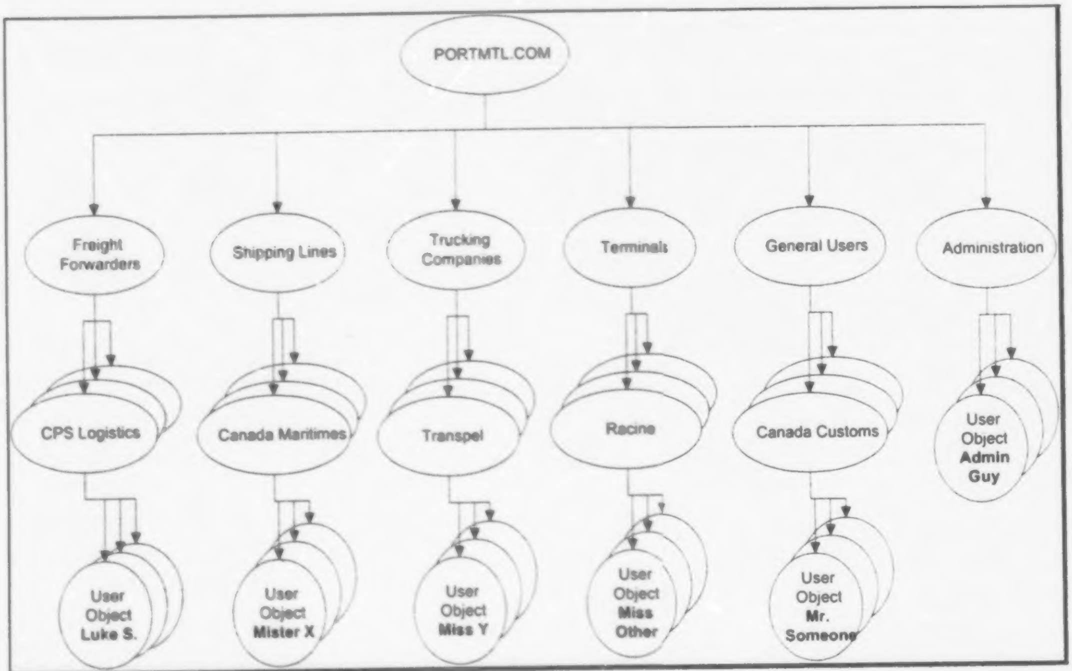

PORTMTL.COM
Freight Forwarders
Shipping Lines
Trucking Companies
Terminals
General Users
Administration
CPS Logistics
Canada Maritimes
Transpel
Racine
Canada Customs
User Object Admin Guy
User Object Luke S.
User Object Mister X
User Object Miss Y
User Object Miss Other
User Object Mr. Someone

Figure 33 Port of Montreal Extranet Stakeholders

Note: In the implementation phase, many different objects not shown here will be required. For example, objects for resources (asp, com, etc) will be required and identified at the implementation phase. What is important here is to establish a hierarchical view of the directory.

5.4 Schedule Authentication

5.4.1 Basic Authentication

Available in IIS 5?
Yes. All versions of IIS support basic authentication.

What privileges are required?
By default, all accounts logging on must have the "Logon Locally" logged on 'right', although this is configurable through the *LogonMethod* ADSI property.

Supports delegation?
Limited. The request can leave the Web server and access resources on a remote computer, as long as the account exists on both computers, the passwords are the same, or domain accounts are used. However, if Basic authentication is used in conjunction with an Active Directory, full delegation is supported.

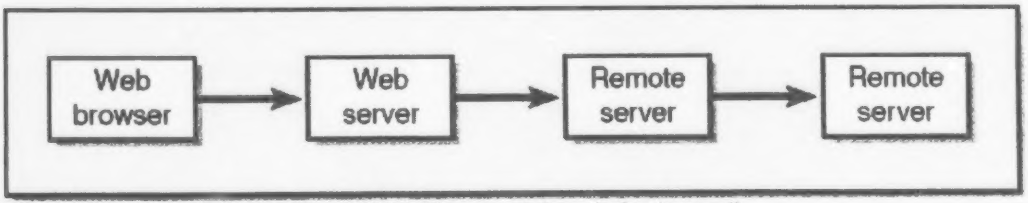


Figure 34 Delegation Capabilities Diagram (when Active is used)

Requires Active Directory?
Yes, to ensure fully supported delegation.

Browser support?
All. Basic is a well-supported authentication protocol.

Works through proxies and firewalls?
Yes.

Other notes
Basic authentication is defined in RFC 2617 (available at http://www.ietf.org/rfc/rfc2617.txt).

5.5 Integrated Windows Authentication and Kerberos Support

Available in IIS 5?
Yes, but only in IIS 5.

What privileges are required?
The "Logon Across The Network" logon right is required; also, the account must not be marked as sensitive in Active Directory.

Supports delegation?
Yes, if Kerberos is chosen rather than NTLM and the environment is configured to support delegation. No, if NTLM is used.

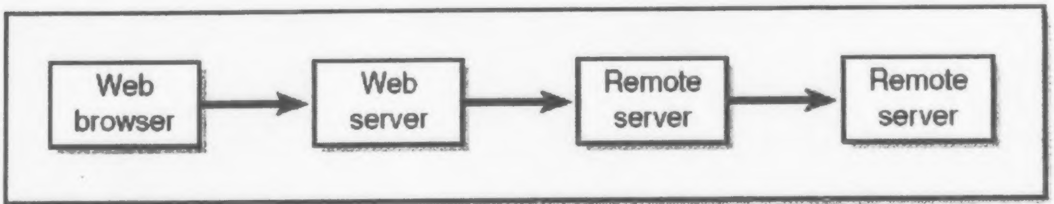


Figure 35 Delegation Capabilities Diagram (when Kerberos is used)

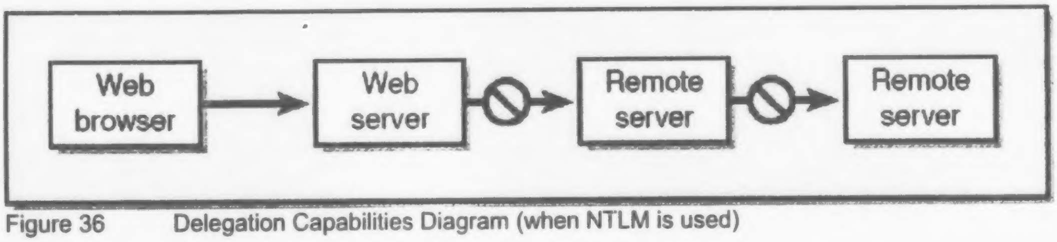


Figure 36 Delegation Capabilities Diagram (when NTLM is used)

Requires Active Directory?
Yes. If the Active Directory is not installed, NTLM will be used and delegation will stop at the Web Server.

Browser support?
All versions of Internet Explorer (after release 1) support NTLM. Internet Explorer 5 and higher support NTLM and Kerberos.

Works through proxies and firewalls?
Partially. The protocol will work through firewalls as long as the appropriate ports are opened. However, this is not encouraged because of the security ramifications of opening specialized authentication ports. This is why, for the administrator, a dedicated VPN Box will be used and a special interface on the firewall will be configured to track where the traffic is coming from.

Other notes
Integrated Windows authentication uses a negotiation mechanism to determine the authentication mechanism (NTLM or Kerberos), depending on the capabilities of the Web browser and client operating system, as well as the Web server and server operating system. This is why administrators are required to use Windows 2000 Professional.

6 OPERATIONS / SERVICE LEVEL AGREEMENT (SLA)

6.1 Details on the Extranet Operations and Metrics

This section details the Service Level Agreement (SLA) Extranet Community Solution required by the Port of Montreal. The SLA outlines Customer Support Service and operating policies, and defines the nature of the relationship between the Extranet provider and its members (end users, super users, and the Port of Montreal).

The Extranet provider's priority commitments are to deliver the highest quality service and guarantee a high level of service for all activities over which it has control. To ensure a high level of service and efficiency, operations should be organized to offer problem resolution escalation procedures. A reported problem would therefore become the responsibility of Support Services and be resolved at the appropriate level.

Customer and Support Services should be organized to provide a single point of contact for stakeholders.

6.2 Service Commitment

6.2.1 Hours of Operation

A 24-hour operation with on-site and on-call technical support personnel should be available. Systems operations should be automated and monitored on a 24/7 basis.

6.2.2 Maintenance Windows

Scheduled Maintenance

Service should be available 24 hours a day, 7 days a week, except for scheduled downtime for maintenance purposes.

Certain time periods should be scheduled for changes that do not require advance notice. These time periods could be scheduled for Sundays from 12:01 a.m. to 8:00 a.m. Eastern Time (ET). Maintenance windows do not automatically mean downtime.

If the provider uses the services of a third party, with possible differences in maintenance windows, then it should be clear that the provider will only measure availability on the components under its control. Thus, customers using their own Internet Service Provider (ISP) should be aware of their ISP's scheduled maintenance windows.

Emergency Maintenance

When emergency maintenance is required, the Extranet provider should plan for the greatest amount of lead time and arrange, along with client management, a solution that minimizes the impact on the user community.

6.2.3 Availability Commitment

Network and systems should be monitored and managed to ensure committed levels of availability every month, apart from the objectives set for scheduled maintenance periods. Monthly service availability should be measured only in relation to the components under the Extranet provider's control.

The provider should monitor and manage capacity to ensure that commitments regarding bandwidth, accessibility, and response time are within operating parameters. The Extranet provider should not guarantee ISP network availability or Internet performance.

Network

The Network should be monitored and managed to ensure a committed level of availability exceeding 98.5%, apart from scheduled maintenance windows. These numbers should be determined on a 13-week rolling average.

Systems

Systems (servers) should be monitored and managed to ensure a committed level of availability exceeding 98.5%, apart from scheduled maintenance windows. These numbers should be determined monthly.

Services

Services should be monitored and managed to ensure a committed level of availability exceeding 98.5%, apart from scheduled maintenance windows. These numbers should be determined on a 13-week rolling average.

Example of availability percentage

An example of how to calculate the availability of the systems is illustrated below.

First: Find the net hours per year:

- 24 hours x 365 days/year = 8760 total hours per year
- 8 hours x 52 weeks/year = 416 maximum hours of planned outages

Therefore, Net Hours of Availability per year is calculated as 8760 – 416 = **8344**.

Second: Target a percentage for total system availability:

- For example: 98.5% x 8344 net hours per year = **8219** hours of availability per year.

6.2.4 File Backup and Recovery Time

The Extranet provider should have operative processes that insure data safekeeping and recovery. The provider should back up all servers on a daily basis.

Backups of critical files should be run and then sent to a secure off-site vault storage on a daily basis. These critical files include the system files necessary for system recovery. Full backups should be made initially, when production starts, and subsequently on a weekly basis. To summarize:

- Incremental backup daily;
- Full backup weekly;
- Full backup monthly;
- Full backup annually;
- Detailed backup status reports should be produced.

The provider must make sure that all files have backups in order to restore the system with a minimum delay in the event of a crash. Necessary measures should therefore be installed, such as agent SQL, exchange, etc.

Data Retention

PERIOD	FREQUENCY/TYPE	RETENTION
Daily	12*/Incremental	2 weeks
Weekly	4*/Full	1 month
Monthly	12*/Full	1 year

Table 71 Data Retention

Disaster Recovery

At the request of the Port of Montreal, disaster recovery plans will not be addressed in this report.

6.3 Customer Support Commitments

6.3.1 Call Handling

The Extranet providers Customer Service and Technical Help Desk should be set up to provide a single point of contact for all stakeholders.

Bilingual

All standard customer and support services should be offered in both French and English.

Access Contact Information

Customer and support services should be equipped with a specific toll-free telephone number accessible throughout North America. Customers should have the option, through an Interactive Voice Response system (IVR), of choosing the technical or administrative group.

Call classification

Agents responding to calls should attempt to classify each call by level of difficulty and call priority, following a custom script and call-routing process. Priority will be established according to the probable impact on the customer's business.

6.3.2 Administrative Roles

Support staff

- Help Desk personnel:
    - Handle all technical requests and activities involved in problem resolution, and take responsibility for trouble reporting;
    - Initiate escalation procedures;
    - Advise customers of the status of the problem resolution.
- Business Office personnel:
    - Handle all activities regarding registration and billing;
    - Handle all account information and billing inquiries.
- Customer Service Manager (CSM):
    - Represents the Extranet provider;
    - Acts as the single point of contact between the super users and the Port of Montreal Administrator;
    - Manages the Operations Work Order (OWO);
    - Obtains authorizations from the POM Administrator for company eligibility and OWO.
- Organization Super User:
    - Represents each member of the Extranet community (one per company);
    - Provides required information;
    - Authorizes access for end users;
    - Submits registration forms;
    - Assesses performance according to Service Level Agreement;
    - Analyses and interprets billing information;
    - Acts as the primary interface with the Extranet provider;
    - Provides support to end users;
    - Requests changes and coordinates activities when required;
    - Understands the contractual and Service Level Agreement terms and conditions.

- Port of Montreal (POM) Administrator:
  - Represents the Port of Montreal;
  - Authorizes company registrations;
  - Approves changes requested by super users.

Operations and Maintenance

- Administrative agent:
  - Handles company and end-user data entry in the database (e.g., registration).
- Operators and technical agents:
  - Manage the database;
  - Move approved Operations Work Orders (OWO) in production;
  - Monitor and control each network component to allow proactive corrective action to be taken and therefore avoid potential problems leading to poor performance or system failure (maintain the system within SLA parameters);
  - Escalate within the organization to the next level;
  - Ensure escalation procedures are respected;
  - Obtain updates on problem resolutions that are given to Help Desk agents to keep the customer informed;
  - Produce monthly reports on availability and make recommendations.

6.3.3 Business Office

Hours of Support

Standard hours of support should be Monday to Friday, from 8:00 a.m. to 6:00 p.m. Eastern Time, excluding holidays.

Responsibilities

The Business Office should be able to answer all account and billing inquiries, take requests for end-user account creation in accordance with specific contract conditions, and establish procedures of approval.

The Business Office should set up its account hierarchy as follows:

- **SERVICE PROVIDER:** A company that offers services to other organizations and end users. A service provider usually falls under the HUB name.

- **HUB:** The core of a number of users and organizations. Both end users and organizations would fall under a particular hub.

- **ORGANIZATION:** A company or group forming a legal entity that includes users of services. An organization is made up of users. One super user is designated for each organization.

- **END USER:** An end user is the bearer of a user name and password to access the Extranet. An end user is usually a member of an organization.

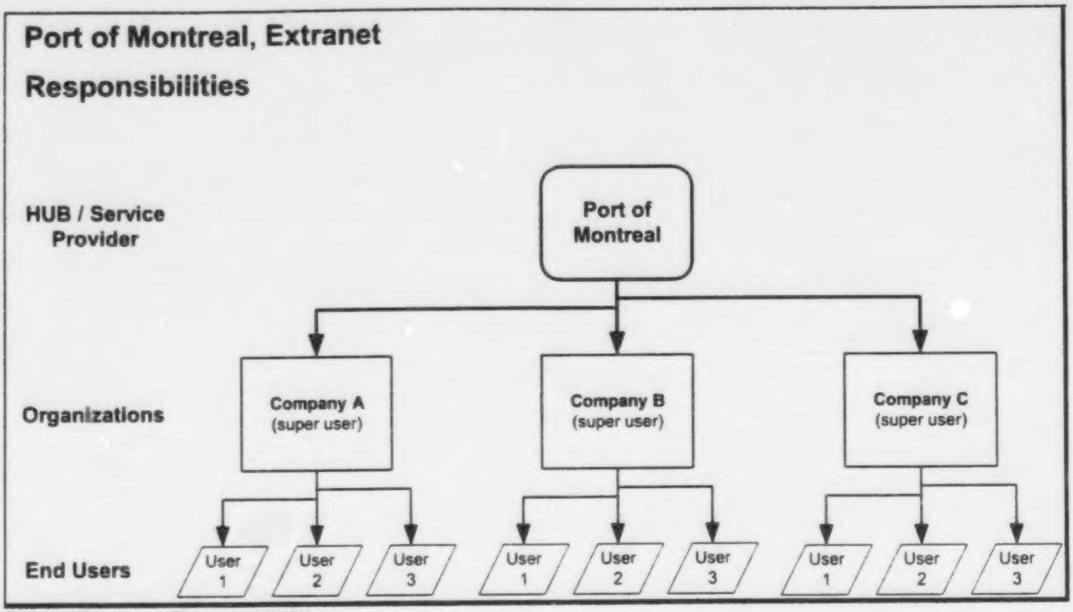

Port of Montreal, Extranet
Responsibilities
HUB / Service Provider
Port of Montreal
Organizations
Company A (super user)
Company B (super user)
Company C (super user)
End Users
User 1
User 2
User 3
User 1
User 2
User 3
User 1
User 2
User 3

Figure 37 Responsibilities

The Business Office must provide a Welcome Kit to the requester within 48 hours (2 business days). The Welcome Kit is made up of two sections: section one is the administrative information required to register an organization; section two is for end-user registrations but these can only be processed after the organization's registration has been accepted by the POM committee.

Welcome Kit section one - Administrative information:

1. **Nomination of a super user.**
    - A description of the super user profile requirements should be provided.
2. **Credentials required by the Port of Montreal to be eligible.**
    - A description of the requirements, established with the POM committee, should be provided.

Welcome Kit section two – End user registration:

1. **End user information.**
    - Name, title, e-mail, language, organization,etc.
    - Completed by Business Office agent.
2. **Data information to build Extranet database.**
    - Equivalence code, preferred format for download and upload, set-up connection parameters, etc.
    - Completed by operations group.

Note that the designation of a super user is required to register an organization. This resource becomes the Administrator within the company and authorizes members. The super user should therefore be an employee of the registered organization.

From an organization's point of view, the super user becomes the single point of contact between the Customer and Service Support groups, the CSM, the end users, and the Port of Montreal. From the Extranet provider's point of view, the CSM is the single point of contact between the super users and the POM Administrator.

Therefore, the Business Office and Help Desk should refer end users to their super user, and refer the POM Administrator and super users to the CSM.

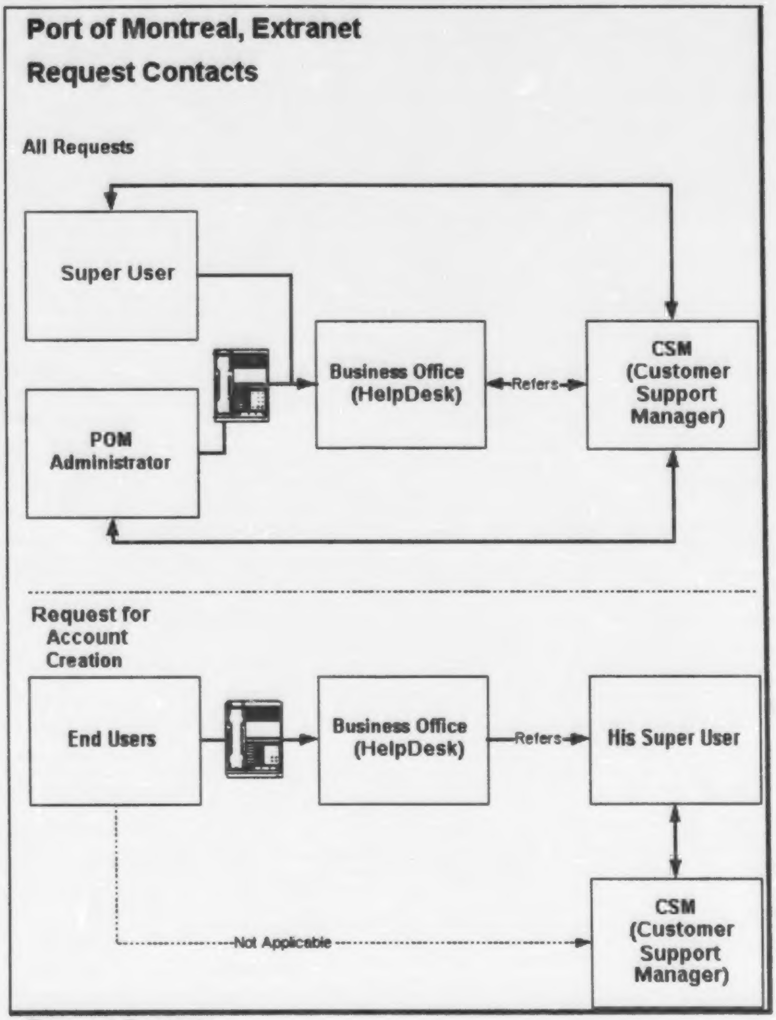

Port of Montreal, Extranet
Request Contacts
All Requests
Super User
POM Administrator
Business Office (HelpDesk)
Refers
CSM (Customer Support Manager)
Request for Account Creation
End Users
Business Office (HelpDesk)
Refers
His Super User
CSM (Customer Support Manager)
Not Applicable

Figure 38 Request Contacts

All requests should come from super users or the POM Administrator. Requests other than end-user account creation should go to the CSM.

The CSM should validate the information provided by the super users and obtain authorization from the POM Administrator. The CSM therefore manages all Operations Work Order (OWO) requests. The OWO is a change request tool that details the activities required to implement or change the solution in production, following a super user's request.

If an end user submits a request to the Business Office to register, the Business Office agent must first verify the existence of the end user's organization in the database:

- **If the organization does not exist:**
  The absence of the organization in the Extranet database means that no super user was nominated and that the Port of Montreal has not authorized this organization to be a member of the Extranet. The Business Office agent must therefore provide section one of the Welcome Kit to the end user. Section one contains the administrative information required to register the organization as a member of the Extranet.

  The organization must then nominate a super user.

  The super user sends the complete forms from section one of the Welcome Kit to the Customer Service Manager (CSM), who validates the information before forwarding the registration request to the POM Administrator for approval.

  Once the request is approved, the CSM returns the registration forms to the Business Office, which then proceeds with the organization's registration.

- **If the organization does exist:**
  If the company exists in the Extranet database, then the Business Office agent must refer the end user to the super user, who is the administrative contact.

Enduser registration:
It is the super user's responsibility to register end users. Therefore, the super user must complete section two of the Welcome Kit and return it to the Business Office for processing. The Business Office agent completes the first part of section two of the Welcome Kit (**End user information)** and then supplies the operations group with the second part of section two (**Data information to build Extranet database).**

Once the account is created by the operations group, the operator must return the data to the Business Office to generate the personal and confidential data (user ID and password). The Business Office should then contact the outsourced distributor to have the customer package distributed to the individual end user. This package consists of a User guide, a welcome letter with the user's personal and confidential data, a CD, and information about the Customer Support Centre.

Monthly Reports

Monthly reports should be required from the Business Office group:

Answering statistics:

- Total calls received;
- Total calls answered;
- Average Speed of Answer (ASA);
- Average Talk Time (ATT);
- Total tickets opened;
- Total tickets closed;
- Total tickets closed on initial call.

Business Office unit:

- Number of billing queries;
- Average resolution time;
- Number of customer profile updates (add, modify, delete) received;
- Number of customer profiles created;
- Number of customer profiles modified or deleted;
- Number of Welcome Kits distributed;
- Volume of customer information (user ID, password) distributed.

6.3.4 Help Desk

Help Desk personnel should be trained to serve individual customer needs in a flexible, personalized, and proactive manner.

Hours of Support

Technical support should be available on a 24/7 basis (except on holidays) for the components under the Extranet provider's control.

Proper Identification

Customers calling for technical assistance must be prepared to provide the Help Desk with:

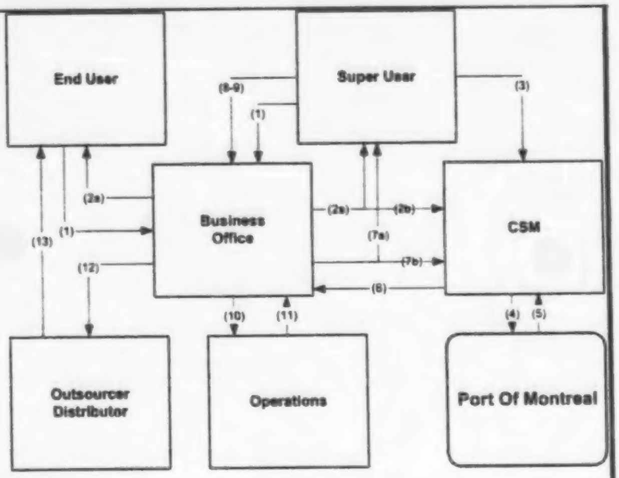
- Name and telephone number;
- Company name;
- User ID;
- The service being used;
- A detailed description of the nature of the problem;
- TCP/IP address if server trouble is being reported.

Customers must advise the Help Desk of all changes made to their application or new services installed to assist the agent in effectively analysing the problem.

Customers should be advised, as specified in the escalation charts, as to when the problem will be resolved. Updates and methods of notification should be specified in a document regarding problem classification and resolution commitments.

Port of Montreal, Extranet

Registration Process



Legend

(1) Request to Business Office by either:
  - End User;
  - Super User.

(2) Business Office returns to the requestor:
  a) Section 1 of Welcome Kit;
  b) Supplies CSM as contact to Super User

(3) Super User returns completed Section 1 to CSM for final validation

(4) CSM presents it to Port Of Montreal (POM) Administration for approval

(5) POM gives approval to CSM

(6) CSM returns approved Section 1 to Business Office to register

(7) Business Office sends Section 2:
  a) To Super User;
  b) Supplies CSM as contact.

(8) Super User completes Section 2

(9) Super User returns Section 2 to Business Office

(10) Business Office sends forms to Operations for account creation completion

(11) Operations sends data to Business Office to generate personal and confidential data sheet

(12) Business Office sends order to OUtsourcer Distributor to distribute customer package

(13) End Users receive their package

Figure 39 Registration Process

Monthly Reports
Monthly reports should be required from the Help Desk group:

Answering statistics:

- Total calls received;
- Total calls answered;
- Average Speed of Answer (ASA);
- Average Talk Time (ATT);
- Total tickets opened;
- Total tickets closed;
- Total tickets closed on initial call.

Help Desk unit:

- Number of problem tickets;
- Breakdown by problem category (Urgent, High, Routine, Low) and further breakdown of customer problems;
- Percentage of problems within objectives;
- Percentage of problems surpassing objectives;
- Percentage of repeated problems.

6.3.5 Escalation Procedures

To ensure a high level of service and efficiency, operations should be set up with problem resolution escalation procedures. A reported problem would therefore become the responsibility of the Help Desk and be resolved at the appropriate level. Support should be offered starting at the first level.

Call escalation procedures should be defined and documented. Internal escalation charts describe the vertical managerial and technical escalation levels. These charts must be followed to respect the Extranet provider's commitment to its customers. Committed to a service of excellence, the Provider's Vice-President of Client Services is notified within two hours for an urgent-priority problem, and within four hours for a high-priority problem.

Automatic escalation and notification to management, both at the provider and customer level ensures visibility, documentation, and resolution within agreed target times. Escalations levels are defined below.

As soon as the agent in charge of the problem determines that the resolution delay will be longer than the time allowable before the next escalation step, the problem should be proactively escalated to the next level. The agent responsible for resolving a problem must notify the next level within agreed target time frames.

First Level Support:
This level of support is provided by the Help Desk. If Help Desk personnel cannot resolve the problem, they should escalate to the appropriate second level of support. First level support is responsible for the problem and reports the resolution to the customer, escalating as required.
Second Level Support:
This level of support handles more complex troubles. If the problem is unable to be resolved, it escalates to the next level.
Third Level Support:
This level of support would only be involved in very complex problems. All outstanding problems that can be fixed without having to go to the supplier are resolved at this level.

Table 72 Levels of Support

6.3.6 Problem Classification and Resolution Time

Problems and user requests should be recorded in a call ticketing system and critically evaluated. For each problem classification, customers should be advised as to when the problem will be resolved.

A ticketing system is recommended to allow the Administrator to keep track of tickets and to ensure that problem resolution is within the terms of the service level agreement. Monthly reporting of problem tickets should be produced by the ticketing system.

Level of severity

Calls are classified with customer consent and may be reclassified as new information becomes available. Customers are notified of all changes in classification. A problem ticket is opened for each and every call.

To escalate customer problems, at least four levels of severity and their estimated time of resolution should be designated. Customers must be advised of the estimated time of resolution:

- **URGENT** (service affected) – Less than four business hours from time of initial notification.
- **HIGH** (service reduced) – Less than eight business hours from time of initial notification.
- **ROUTINE** (service not affected) – Less than two business days from time of initial notification.
- **LOW** – Less than five business days from time of initial notification.

The Support Centre should retain responsibility for a problem or inquiry until resolution, and is supported by a number of higher levels of support. It should also handle problems or inquiries related to the Administrative, Operation, or Technical areas.

Problem Classification, Notification, and Escalation

All problems or inquiries for which the Extranet provider's Customer Support Service and/or Technical Help Desk are responsible should be classified as follows:

Priority Level		Description	Customer Notification/ Update	Escalation Levels
1	**Urgent** (High Business impact)	Involves situations where the application or network facilities are inoperable. Also involves situations where a large number of partners are affected or where the financial considerations are significant.	Notification: 30 minutes Update: every 60 minutes	1st level: 30 minutes 2nd level: 60 minutes 3rd level: 90 minutes 4th level: 120 minutes
	Resolution Objective*: Less than 4 business hours			
2	**High** (Low Business Impact)	Involves situations where service is available in a reduced capacity because of problems with one or more components of the network. Also involves situations where a limited number of partners are affected or where the financial considerations are minor.	Update: every 60 minutes	1st level: 1 hour 2nd level: 2 hours 3rd level: 3 hours 4th level: 4 hours
	Resolution Objective*: Less than 8 business hours			

Priority Level		Description	Customer Notification/ Update	Escalation Levels
3	**Routine** (Service Transparent)	Involves situations where service is neither interrupted nor reduced. Calls in this category may include general questions.		1st level: 1 business day 2nd level: 2 business days
	Resolution Objective*: Less than 2 business days			
4	**Low** (No business impact)	Action item or special report.		
	Resolution Objective*: Less than 5 business days			

Table 73 Problem Classification, Notification, and Escalation

*** Note:** The Extranet provider should make reasonable efforts to resolve the problem in the required time. However, when application problems arise, the resolution time may have to be extended due to the complexity of the problem. In certain cases, the resolution of a problem requires a change to the system. These types of resolutions are escalated to the Change Management Committee.

Single point of contact

The Help Desk agent should act as the single point of contact for all users. Callers should be kept informed via e-mail and all trouble resolutions are to be reported to the caller prior to closing the ticket

7 ORIENTATION AND FUTURE DEVELOPMENT OF THE EXTRANET FUNCTIONALITY

7.1 Application's Future Enhancements

As stated earlier, the application described in this report is the first step toward a fully integrated solution for container management at the Port of Montreal.

Here is a list of new functions that can be added to the Extranet application to further improve container tracking and tracing. These functions will be added to the Extranet application when the Port of Montreal community acknowledges that the current configuration has demonstrated appreciable gains in efficiency and productivity.

1. Functions for tracking and tracing Containers handled by Railway Companies;
2. Functions for handling several Containers per Order to Carrier, rather than the current one-Container-per-order basis;
3. Functions to exchange information with other international ports that handle Containers;
4. Integration with smart card authentication for Truck Drivers, which sends transactions to the Extranet when the Truck Driver arrives at or leaves from a specific Terminal;
5. Functions for electronic Container billing for various stakeholders;
6. Functions to view images from Terminal gate video cameras to assess the queuing situation at the gate. Images from highway cameras could also be integrated to provide information to Trucking Companies;
7. Graphical representation of Containers (different pictures for regular, open top, high cube, flat, or reefer);
8. Functions to produce official Extranet reports and documents (e.g., the TIR, documents for customs, etc.).
9. Function to allow Trucking Companies to acknowledge Empty Memos. Additional fields on screens could indicate to the Freight Forwarder that the Trucking Copany has accepted the Memo.

The application is designed to evolve easily by adding new functions. If the Port of Montreal or one of the stakeholders involved in the Extranet should suggest additional new functions, an impact analysis on the Extranet can be made to add these new features.

APPENDIX A - INSTALLATION COSTS

We recommend ordering servers with dual CPUs since CPU steppings (micro code revisions) tend to evolve over time, and availability becomes an issue. Unmatched CPU steppings can result in an unstable server platform. Another advantage is that the OS will initially be installed with the proper, multiple CPU kernel, minimizing eventual kernel update risks on a single CPU production system.

Compaq CarePaq service offers initial hardware installation for the server and rack set-up. We suggest using this service because this kind of work can be a daunting task even for experienced users, and yet it is crucial for high availability and server performance. Appendix B provides an estimated cost of these servers and rack components. Covered in this cost are the following:

- *Product Installation* – includes equipment unpacking (if required), inspection, assembly, installation as per product specifications, standard testing/diagnostic routines, and installation of appropriate service tools. Software products are configured to base level and tested;
- *Service Completion Report* – details work accomplished, location where the work took place, warranty or service obligation for installed products, and information on logging service calls.

End-User benefits:

- Frees internal resources to focus on other responsibilities;
- Saves time and energy involved in unpacking, assembling, and configuring software products;
- Ensures new and relocated equipment is up quickly and efficiently, and running properly;
- Augments existing on-site technical staff.

To purchase or obtain more information on Compaq CarePaq services, contact an authorized Compaq Service Reseller. To find a reseller near you, visit the following URL:

http://compaq.infonow.net/bin/findNow?CLIENT_ID=COMPAQ_BUS_USA&MARKET=SERVICE

APPENDIX B - BILL OF MATERIALS: PRODUCTION ENVIRONMENT

Summary of materials – Port of Montreal Extranet

Switching and Routing Equipment

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
A	**Redundant Border Routers**	Cisco Router Model 2621	2	$4 673.00	$592.00	**$10 530.00**
C	**Layer 2 Switch - Screened Network (24 ports)**	Cisco WS-C2924M-XL-EN	1	$3 012.00	$438.00	**$3 450.00**
Q	**Layer 2 Switch - Management Network (24 ports)**	Cisco WS-C2924M-XL-EN	1	$3 012.00	$438.00	**$3 450.00**
H	**Layer 2 Switch - App/Int/Backup Network (48 ports)**	Cisco WS-C2948G	2	$9 052.00	$1 095.00	**$20 294.00**
				Total		**$37 724.00**

Security Components

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
B	**External Firewall Hardware**	Sun Netra t1 Model 105	1	$20 830.00	$3 000.00	$23 830.00
	Software	Check Point FireWall-1	1	$7 695.00	$4 200.00	$11 895.00
						$35 725.00

G	**Internal Firewall Hardware**	Sun Netra t1 Model 105	1	$20 830.00	$3 000.00	$23 830.00
	Software	Check Point FireWall-1	1	$7 695.00	$4 200.00	$11 895.00
						$35 725.00
P	**Firewall Console Hardware**	Sun Netra t1 Model 105	1	$20 830.00	$3 000.00	$23 830.00
	Software	Sun Netra t1 Model 105	1	$16 192.00	$4 200.00	$20 392.00
						$44 222.00
R	**VPN Concentrator**	Nortel Contivity Extranet Switch 2600 Model DM1401053	1	$20 000.00		$20 000.00
				Total		**$135 672.00**

Server Components

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
D	**Active Directory Server Hardware (External)**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		1	$1 305.00		$1 305.00
	Installation Services (hourly rate)		10	$70.00		$700.00
						$21 563.00

E	**Mail Server Hardware**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Windows 2000 Exchange Server Software		1	$685.00		$685.00
	Exchange 2000 Server Client Access Licenses		10	$65.00		$650.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		1	$1 305.00		$1 305.00
	Installation Services (hourly rate)		15	$70.00		$1 050.00
						$23 248.00
F	**Web Server(s) Hardware**	Compaq ProLiant DL380	2	$16 508.00	$1 400.00	$35 816.00
	Windows 2000 Advanced Server Software		2	$3 500.00		$7 000.00
	Anti-Virus Software		2	$900.00		$1 800.00
	HP OpenView agent		2	$1 305.00		$2 610.00
	Installation Services (hourly rate)		20	$70.00		$1 400.00
						$48 626.00
I	**Translator Server**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	BizTalk 2000 Software	MSD75-00002	1	$11 000.00		$11 000.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		1	$1 305.00		$1 305.00
	Installation Services (hourly rate)		30	$70.00		$2 100.00
						$33 963.00

J	**Transaction Server**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		1	$1 305.00		$1 305.00
	Installation Services (hourly rate)		10	$70.00		$700.00
						$21 563.00
K	**Active Directory Server Hardware (Internal)**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		1	$1 305.00		$1 305.00
	Installation Services (hourly rate)		10	$70.00		$700.00
						$21 563.00
L	**SQL Cluster Servers Hardware**	2 Compaq ProLiant DL380 with common external storage	1	$62 914.00	$3 200.00	$66 114.00
	Windows 2000 Advanced Server Software		2	$3 500.00		$7 000.00
	Windows SQL 2000 Enterprise Server Licenses (25 CAL)		2	$8 050.00		$16 100.00
	Anti-Virus Software		2	$900.00		$1 800.00
	HP OpenView agent		2	$1 305.00		$2 610.00
	Installation Services (hourly rate)		20	$70.00		$1 400.00
						$95 024.00

M	**Backup Server Hardware**	Compaq ProLiant DL380 with Tape Library	1	$39 960.00	$1 400.00	$41 360.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Veritas Backup Exec Agent for SQL Server 2000		1	$1 639.00		$1 639.00
	Veritas Backup Exec Agent for Exchange Server 2000		1	$1 500.00		$1 500.00
	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		2	$1 305.00		$2 610.00
	Installation Services (hourly rate)		20	$70.00		$1 400.00
						$50 159.00
N	**Monitoring Server Hardware**	HHP9000 model L1000, 2CPUs	1	$60 000.00	$8 000.00	$68 000.00
	HP OpenView VantagePoint Module including Network Node Manager		1	$84 499.00		$84 499.00
	Installation Services (hourly rate)		70	$70.00		$4 900.00
						$157 399.00
O	**Logging & Reporting Server Hardware**	Compaq ProLiant DL380	1	$18 008.00	$1 400.00	$19 408.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Windows SQL 2000 Server Licenses		1	$750.00		$750.00
	Windows SQL 2000 Server Client Access Licenses		10	$66.00		$660.00
	CiscoWorks Software		1	$22 500.00	$906.00	$23 406.00
	WebTrends Software - Firewall Suite v3.0		1	$2 569.00		$2 569.00
	WebTrends Software - Log Analyzer Module		1	$950.00		$950.00

	Anti-Virus Software		1	$900.00		$900.00
	HP OpenView agent		2	$1 305.00		$2 610.00
	Installation Services (hourly rate)		30	$70.00		$2 100.00
						$54 103.00
S	**Management Station Hardware**	Compaq Deskpro P600	1	$4 000.00		$4 000.00
	Windows 2000 Professional Software		1	$224.00		$224.00
	Installation Services (hourly rate)		5	$70.00		$350.00
						$4 574.00
T	**Help Desk/Business Office Stations Hardware**	Compaq Deskpro P600	2	$4 000.00		$8 000.00
	Windows 2000 Professional Software		2	$224.00		$448.00
	Installation Services (hourly rate)		10	$70.00		$700.00
						$9 148.00
U	**Ticketing System Hardware**	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	Windows SQL 2000 Server Licenses		1	$750.00		$750.00
	Windows SQL 2000 Server Client Access Licenses		10	$65.00		$650.00
	Anti-Virus Software		1	$900.00		$900.00
	HEAT help desk ticketing software		1	$25 000.00	$3 000.00	$28 000.00
	Installation Services (hourly rate)		30	$70.00		$2 100.00
						$51 058.00

		TOTAL	**$591 991.00**
Accessories			
Compaq Rack Model 9142 (42U)	3	$2 082.00	$6 246.00
UPS R3000	3	$2 625.00	$7 875.00
Keyboard Monitor/Mouse Switch Box (8Port/1U)	2	$1 786.00	$3 572.00
Rack Internal Trackball Keyboard	2	$255.00	$510.00
6' CPU-To-Switch Cable	13	$92.00	$1 196.00
Keyboard Drawer Kit (1U)	2	$368.00	$736.00
Fan (110VAC) Roof Mount	2	$390.00	$780.00
Monitor/Utility Shellf Kit	12	$179.00	$2 148.00
Power Distribution Unit - Low Voltage	3	$380.00	$1 140.00
Rack Blanking Panel Kit (15U)	1	$283.00	$283.00
15" V500 Monitor	2	$520.00	$1 040.00
42U Side Panel Kit	1	$326.00	$326.00
Baying/Coupling Kit	2	$117.00	$234.00
			$26 086.00
		GRAND TOTAL	**$791 473.00**

APPENDIX C - BILL OF MATERIALS: DEVELOPMENT / QA ENVIRONMENT

Summary of materials – Port of Montreal Extranet

Switching and Routing Equipment

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
	Layer 2 Switch - Management Network (24 ports)	Cisco WS-C2924M-XL-EN	1	$3 012.00	$438.00	**$3 450.00**
				Total		**$3 450.00**

Security Components

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
	Q/A & Development Firewall Hardware	Sun Netra t1 Model 105	1	$20 830.00	$3 000.00	$23 830.00
	Software	Check Point FireWall-1	1	$7 695.00	$4 200.00	$11 895.00
				Total		**$35 725.00**

Server Components

Diagram ID	Description	Model	Qty	Unit Price	Annual Support	Extended Price
	Active Directory Server Hardware (Internal & External)	Compaq ProLiant DL380	2	$16 508.00	$1 400.00	$35 816.00
	Windows 2000 Server Software		2	$750.00		$1 500.00
	Anti-Virus Software		2	$900.00		$1 800.00
	HP OpenView agent		2	$1 305.00		$2 610.00
	Installation Services (hourly rate)		20	$70.00		$1 400.00
						$43 126.00
	Web Server(s) Hardware	Compaq ProLiant DL380	3	$16 508.00	$1 400.00	$53 724.00
	Windows 2000 Advanced Server Software		3	$3 500.00		$10 500.00
	Anti-Virus Software		3	$900.00		$2 700.00
	HP OpenView agent		3	$1 305.00		$3 915.00
	Installation Services (hourly rate)		30	$70.00		$2 100.00
						$72 939.00
	Translator Server	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
	Windows 2000 Server Software		1	$750.00		$750.00
	BizTalk 2000 Software	MSD75-00002	1	$11 000.00		$11 000.00

Anti-Virus Software		1	$900.00		$900.00
HP OpenView agent		1	$1 305.00		$1 30500
Installation Services (hourly rate)		30	$70.00		$2 100.00
					$33 963.00
Transaction Server	Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
Windows 2000 Server Software		1	$750.00		$750.00
Anti-Virus Software		1	$900.00		$900.00
HP OpenView agent		1	$1 305.00		$1 305.00
Installation Services (hourly rate)		10	$70.00		$700.00
					$21 563.00
SQL Cluster Servers Hardware	2 Compaq ProLiant DL380 with common external storage	1	$62 914.00	$3 200.00	$66 114.00
Windows 2000 Advanced Server Software		2	$3 500.00		$7 000.00
Windows SQL 2000 Enterprise Server Licenses (25 CAL)		2	$8 050.00		$16 100.00
Anti-Virus Software		2	$900.00		$1 800.00
HP OpenView agent		2	$1 305.00		$2 610.00
Installation Services (hourly rate)		20	$70.00		$1 400.00
					$95 024.00

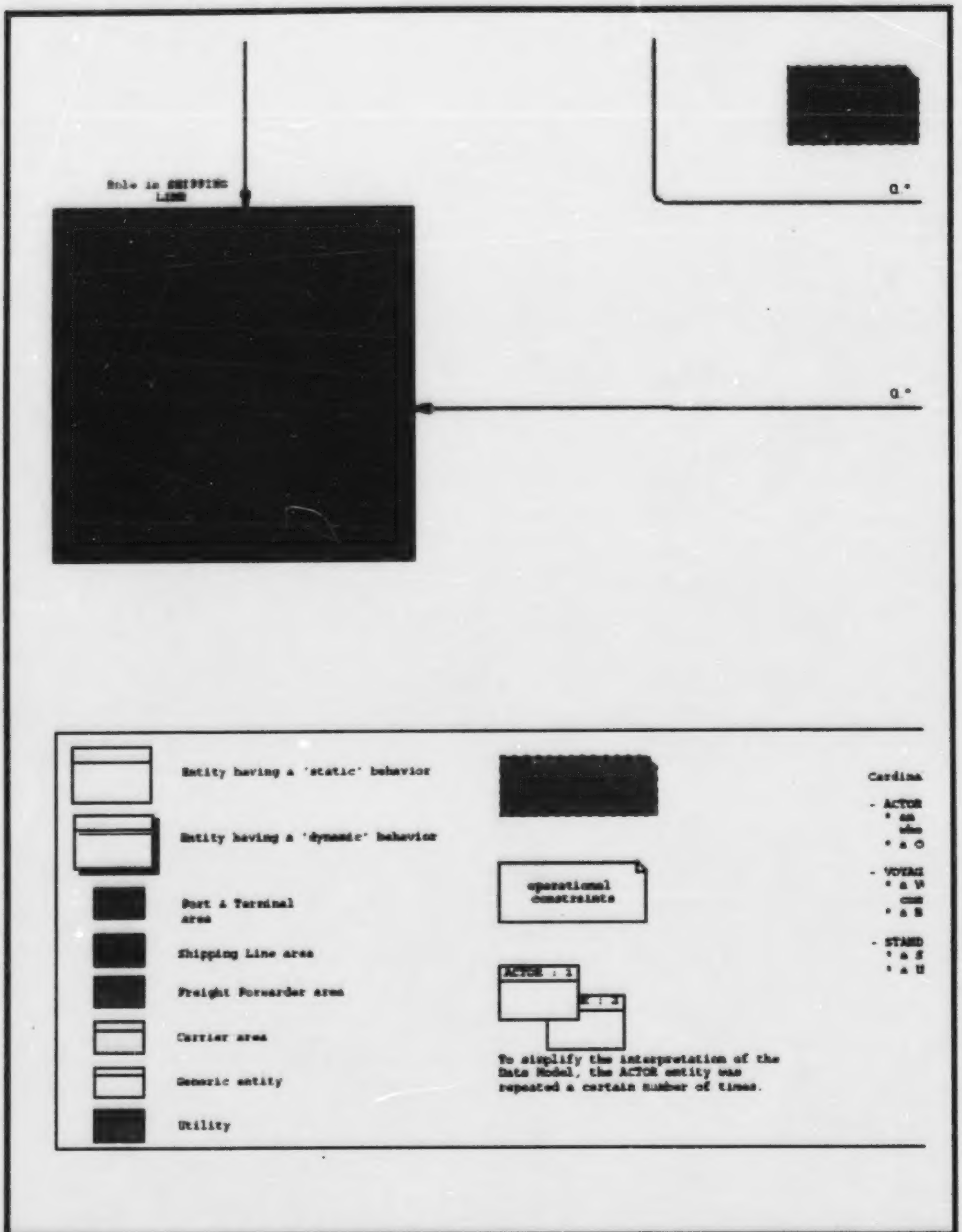
SQL Server Hardware (standalone Q/A)	1 Compaq ProLiant DL380	1	$16 508.00	$1 400.00	$17 908.00
Windows 2000 Advanced Server Software		1	$750.00		$750.00
Windows SQL 2000 Server Licenses (10 CAL)		1	$8 050.00		$8 050.00
Anti-Virus Software		1	$900.00		$900.00
HP OpenView agent		1	$1 305.00		$1 305.00
Installation Services (hourly rate)		10	$70.00		$700.00
					$29 613.00
				TOTAL	**$296 228.00**
Accessories					
Compaq Rack Model 9142 (42U)		2	$2 082.00		$4 164.00
UPS R3000		2	$2 625.00		$5 250.00
Keyboard Monitor/Mouse Switch Box (8Port/1U)		2	$1 786.00		$3 572.00
Rack Internal Trackball Keyboard		2	$255.00		$510.00
6' CPU-To-Switch Cable		13	$92.00		$1 196.00
Keyboard Drawer Kit (1U)		2	$368.00		$736.00
Fan (110VAC) Roof Mount		2	$390.00		$780.00
Monitor/Utility Shellf Kit		6	$179.00		$1 074.00
Power Distribution Unit - Low Voltage		2	$380.00		$760.00
Rack Blanking Panel Kit (15U)		1	$283.00		$283.00
15" V500 Monitor		2	$520.00		$1 040.00
42U Side Panel Kit		1	$326.00		$326.00
Baying/Coupling Kit		1	$117.00		$117.00
					$19 808.00
				GRAND TOTAL	**$355 211.00**

APPENDIX D - COMPAQ CAREPAQ HARDWARE INSTALLATION SERVICE

DL 380 server: $455 (Total of 13 servers will cost $5915)
Server Console Switch: $455 ($910 for two racks)
Rack Enclosure with UPS: $585 ($1170 for two racks)
Storage Chassis: $585
Fiber Channel Hub 7: $455

APPENDIX E – MODEL LEVEL DIAGRAM

Zoomed Display


Role in SHIPPING LINE
0..*
0..*
Entity having a 'static' behavior
Entity having a 'dynamic' behavior
Port & Terminal area
Shipping Line area
Freight Forwarder area
Carrier area
Generic entity
Utility
operational constraints
ACTOR : 1
Cardina
- ACTOR
- VOYAG
- STAND

To simplify the interpretation of the Data Model, the ACTOR entity was repeated a certain number of times.

Figure E-1 Model Level Diagram - Page 1

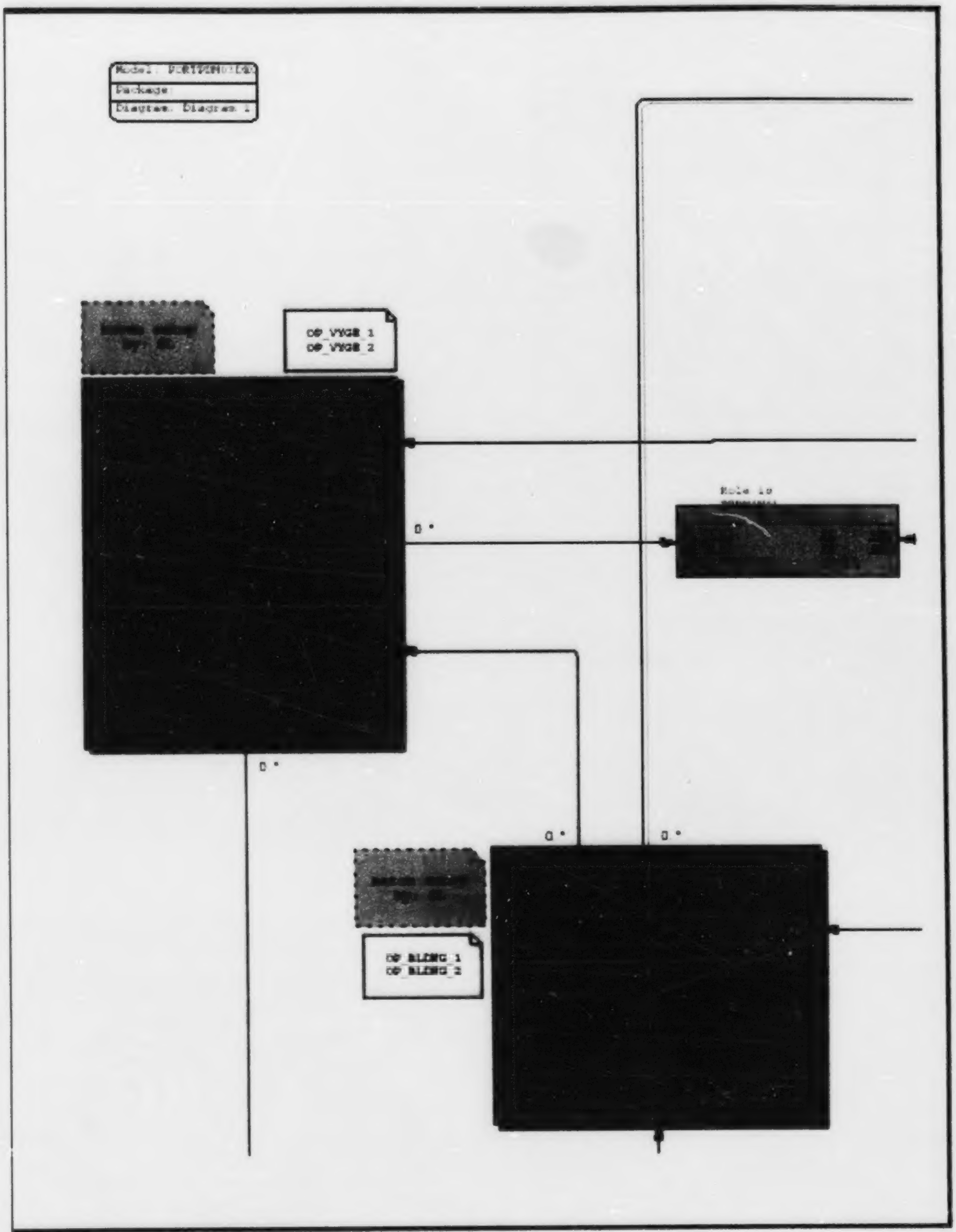
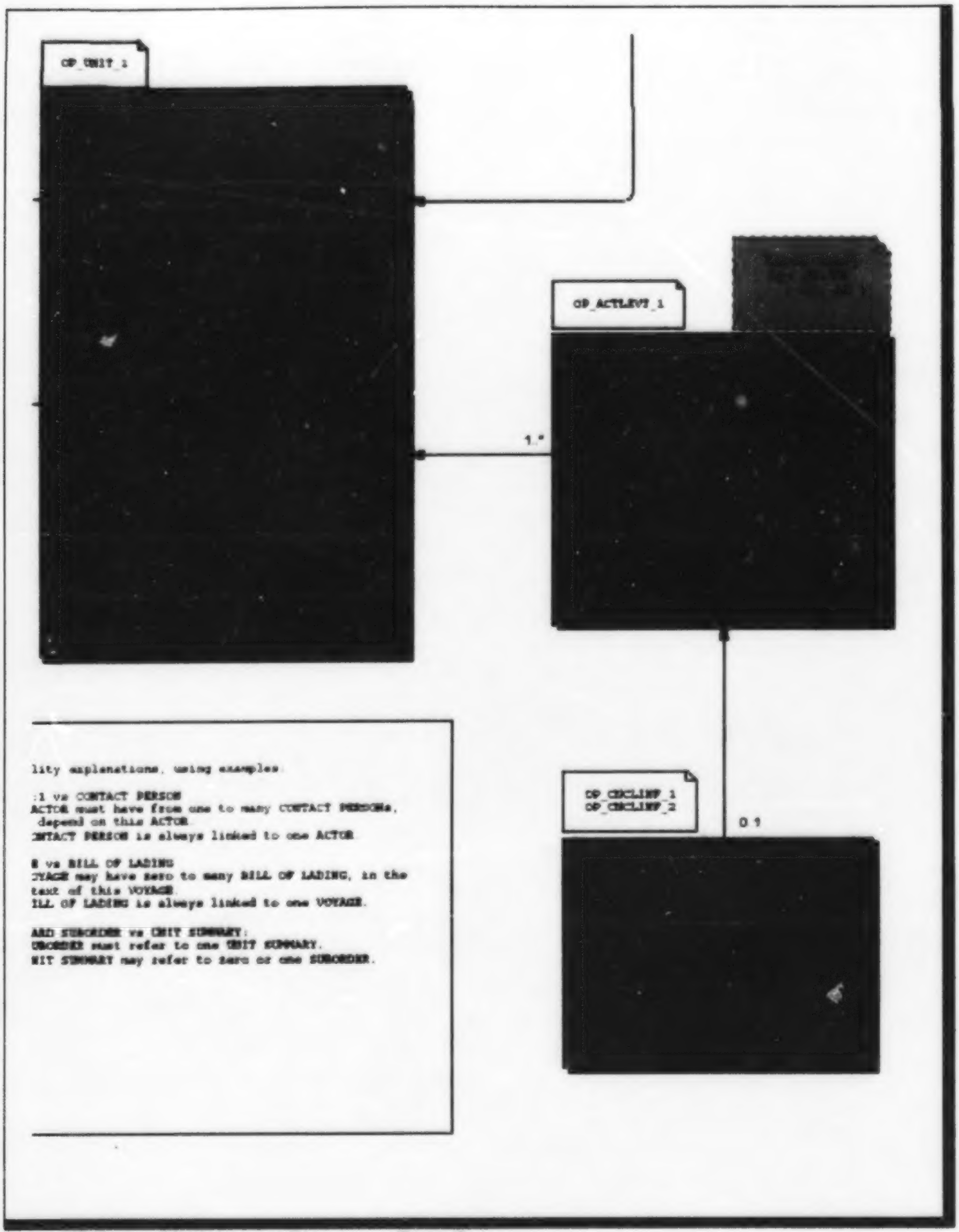

Model: PORTSIM[illegible]
Package:
Diagram: Diagram 1
OP_VYGE_1
OP_VYGE_2
0 *
Role is
0 *
0 *
0 *
OP_BLDNG_1
OP_BLDNG_2

Figure E-2 Model Level Diagram – Page 2



lity explanations, using examples.

:1 vs CONTACT PERSON
ACTOR must have from one to many CONTACT PERSONs,
depend on this ACTOR.
ONTACT PERSON is always linked to one ACTOR.

E vs BILL OF LADING
OYAGE may have zero to many BILL OF LADING, in the
text of this VOYAGE.
ILL OF LADING is always linked to one VOYAGE.

ARD SUBORDER vs UNIT SUMMARY:
UBORDER must refer to one UNIT SUMMARY.
NIT SUMMARY may refer to zero or one SUBORDER.

Figure E-3 Model Level Diagram – Page 3

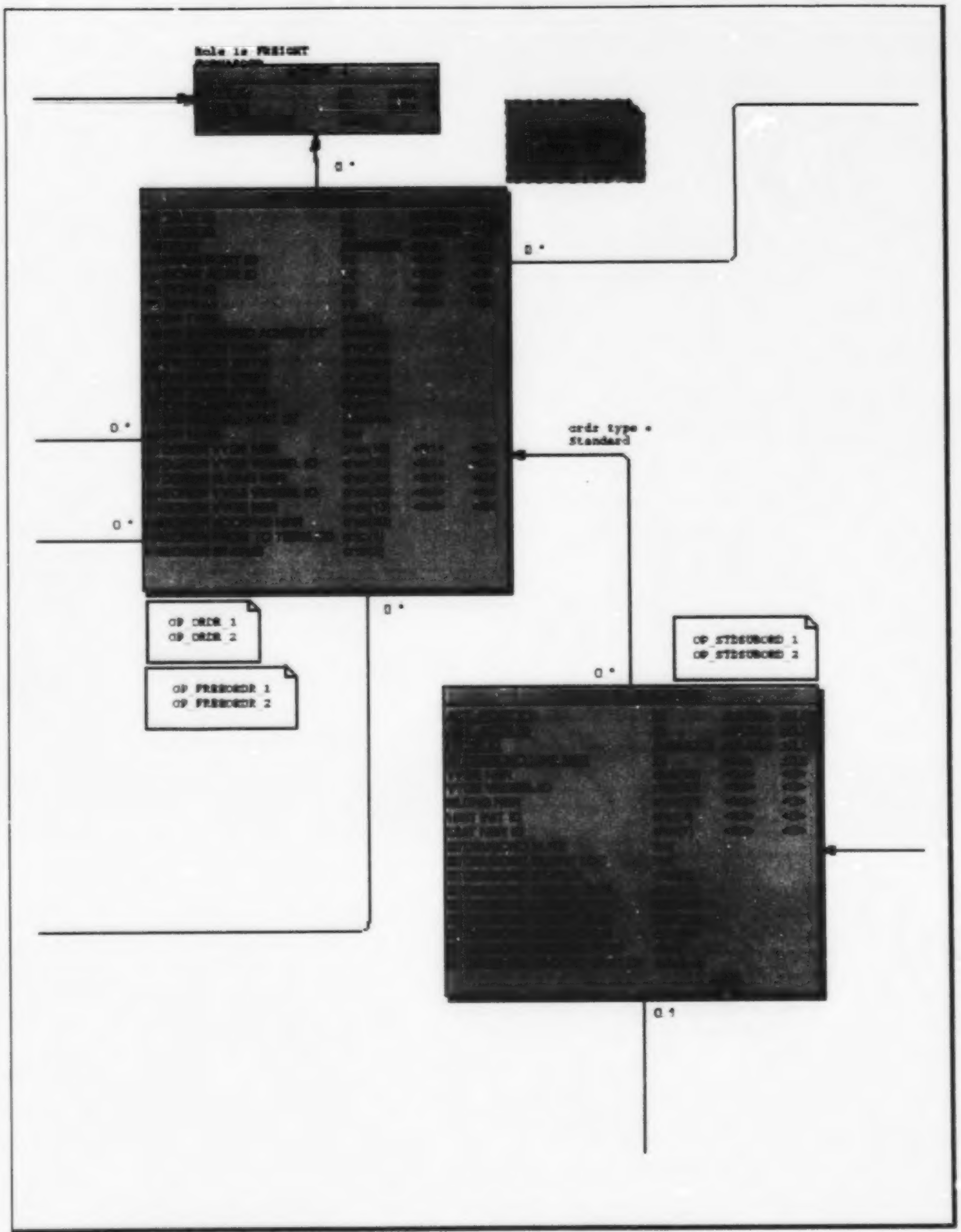

Role is FREIGHT
0 *
0 *
ordr type = Standard
0 *
0 *
OP_ORDR_1
OP_ORDR_2
0 *
OP_FRRHORDR_1
OP_FRRHORDR_2
0 *
OP_STDSUBORD_1
OP_STDSUBORD_2
0 1

Figure E-4 Model Level Diagram – Page 4

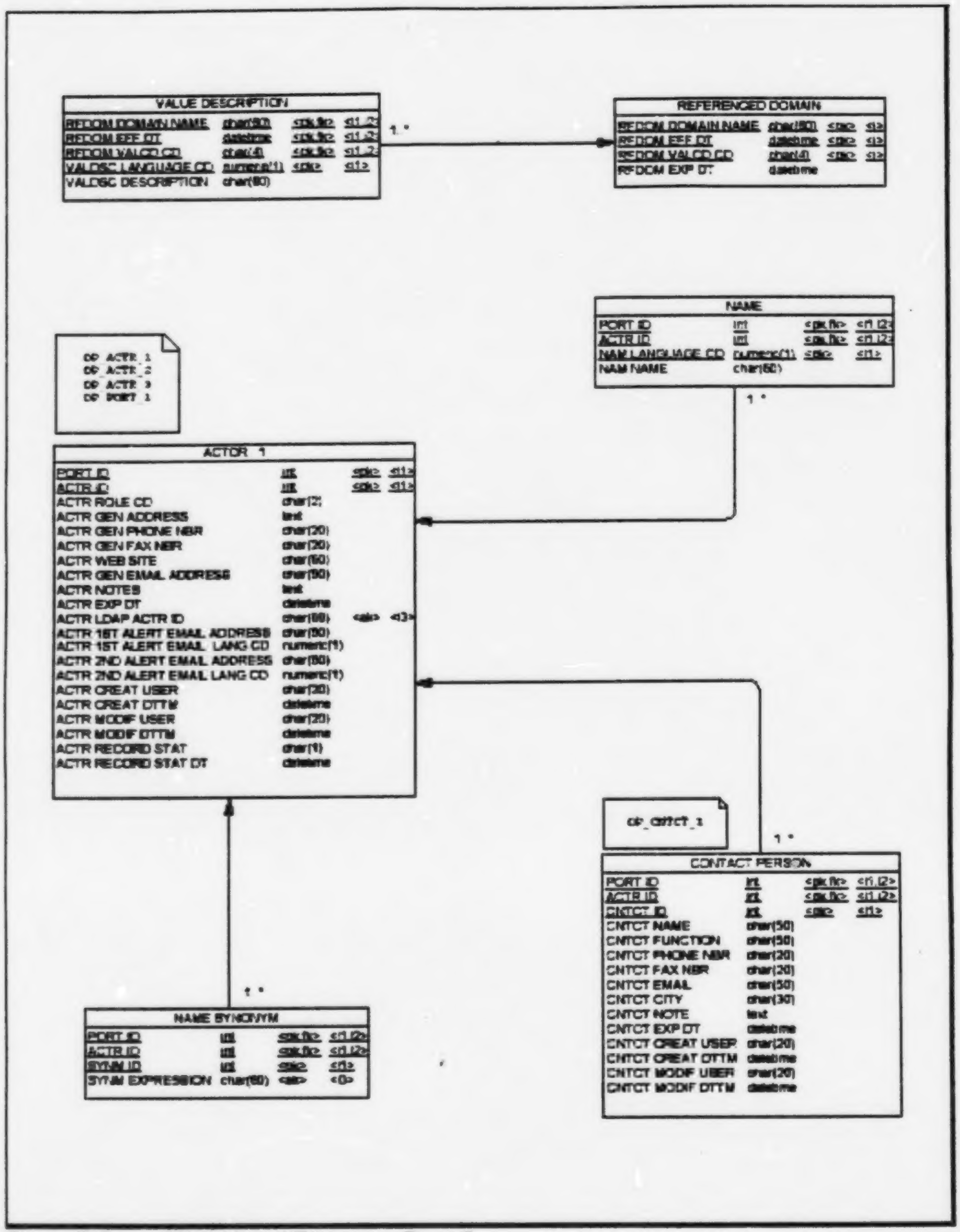
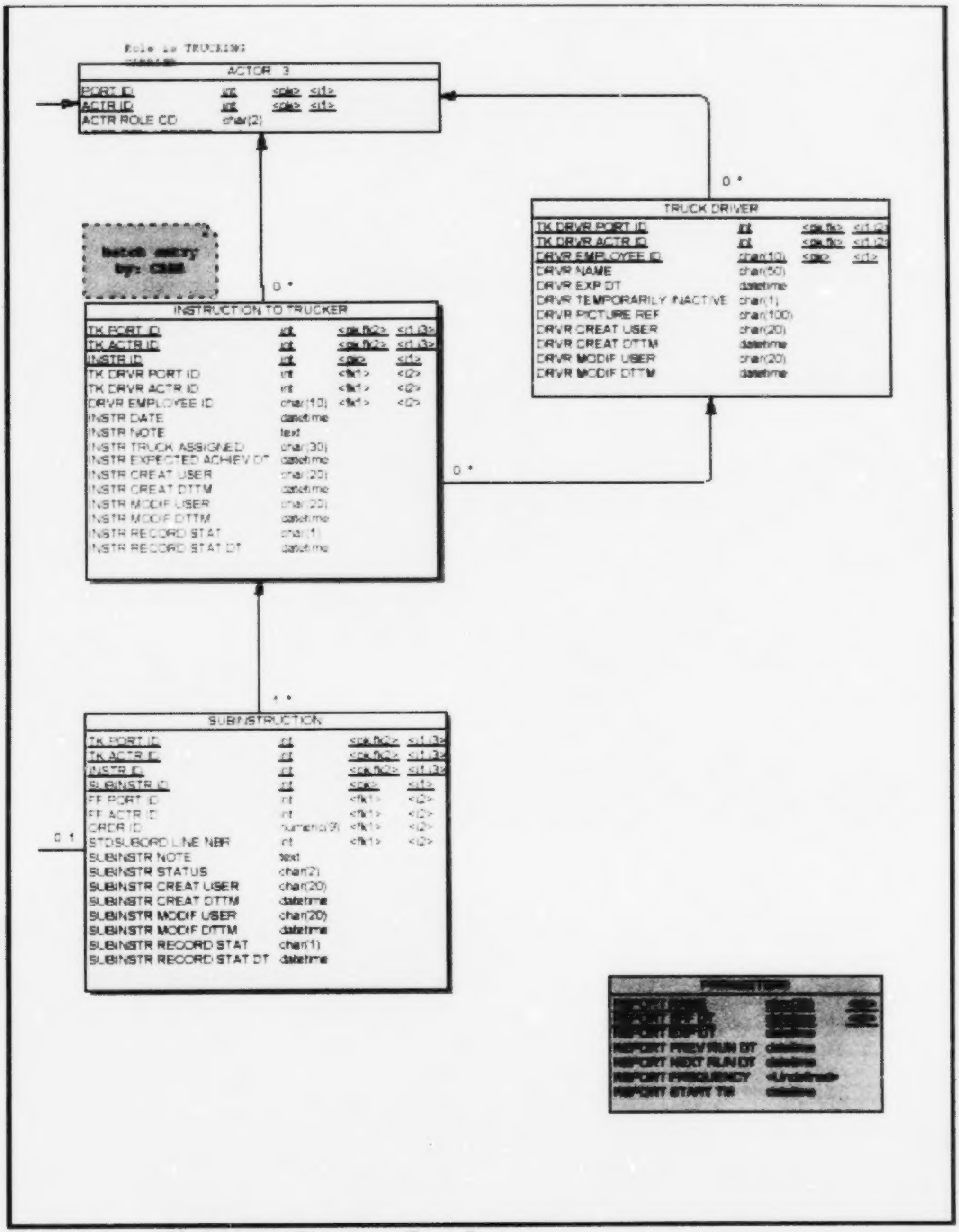

VALUE DESCRIPTION
RFDOM DOMAIN NAME char(80) <pk,fk> <i1,i2>
RFDOM EFF DT datetime <pk,fk> <i1,i2>
RFDOM VALCD CD char(4) <pk,fk> <i1,i2>
VALDSC LANGUAGE CD numeric(1) <pk> <i1>
VALDSC DESCRIPTION char(80)
1..*
REFERENCED DOMAIN
RFDOM DOMAIN NAME char(80) <pk> <i1>
RFDOM EFF DT datetime <pk> <i1>
RFDOM VALCD CD char(4) <pk> <i1>
RFDOM EXP DT datetime
NAME
PORT ID int <pk,fk> <i1,i2>
ACTR ID int <pk,fk> <i1,i2>
NAM LANGUAGE CD numeric(1) <pk> <i1>
NAM NAME char(50)
1..*
DP_ACTR_1
DP_ACTR_2
DP_ACTR_3
DP_PORT_1
ACTOR 1
PORT ID int <pk> <i1>
ACTR ID int <pk> <i1>
ACTR ROLE CD char(2)
ACTR GEN ADDRESS text
ACTR GEN PHONE NBR char(20)
ACTR GEN FAX NBR char(20)
ACTR WEB SITE char(50)
ACTR GEN EMAIL ADDRESS char(50)
ACTR NOTES text
ACTR EXP DT datetime
ACTR LDAP ACTR ID char(50) <ak> <i3>
ACTR 1ST ALERT EMAIL ADDRESS char(50)
ACTR 1ST ALERT EMAIL LANG CD numeric(1)
ACTR 2ND ALERT EMAIL ADDRESS char(50)
ACTR 2ND ALERT EMAIL LANG CD numeric(1)
ACTR CREAT USER char(20)
ACTR CREAT DTTM datetime
ACTR MODIF USER char(20)
ACTR MODIF DTTM datetime
ACTR RECORD STAT char(1)
ACTR RECORD STAT DT datetime
DP_CNTCT_1
1..*
CONTACT PERSON
PORT ID int <pk,fk> <i1,i2>
ACTR ID int <pk,fk> <i1,i2>
CNTCT ID int <pk> <i1>
CNTCT NAME char(50)
CNTCT FUNCTION char(50)
CNTCT PHONE NBR char(20)
CNTCT FAX NBR char(20)
CNTCT EMAIL char(50)
CNTCT CITY char(30)
CNTCT NOTE text
CNTCT EXP DT datetime
CNTCT CREAT USER char(20)
CNTCT CREAT DTTM datetime
CNTCT MODIF USER char(20)
CNTCT MODIF DTTM datetime
1..*
NAME SYNONYM
PORT ID int <pk,fk> <i1,i2>
ACTR ID int <pk,fk> <i1,i2>
SYNM ID int <pk> <i1>
SYNM EXPRESSION char(50) <ak> <i3>

Figure E-5 Model Level Diagram – Page 5


Role is TRUCKING
[illegible]
batch entry
[illegible]
0 *
0 *
0 *
1 *
0 1
REPORT PREV RUN DT datetime
REPORT NEXT RUN DT datetime
REPORT FREQUENCY <Undefined>
REPORT START TM datetime

ACTOR 3			
PORT ID	int	<pk>	<i1>
ACTR ID	int	<pk>	<i1>
ACTR ROLE CD	char(2)		

INSTRUCTION TO TRUCKER			
TK PORT ID	int	<pk,fk2>	<i1,i3>
TK ACTR ID	int	<pk,fk2>	<i1,i3>
INSTR ID	int	<pk>	<i1>
TK DRVR PORT ID	int	<fk1>	<i2>
TK DRVR ACTR ID	int	<fk1>	<i2>
DRVR EMPLOYEE ID	char(10)	<fk1>	<i2>
INSTR DATE	datetime		
INSTR NOTE	text		
INSTR TRUCK ASSIGNED	char(30)		
INSTR EXPECTED ACHIEV DT	datetime		
INSTR CREAT USER	char(20)		
INSTR CREAT DTTM	datetime		
INSTR MODIF USER	char(20)		
INSTR MODIF DTTM	datetime		
INSTR RECORD STAT	char(1)		
INSTR RECORD STAT DT	datetime		

TRUCK DRIVER			
TK DRVR PORT ID	int	<pk,fk>	<i1,i2
TK DRVR ACTR ID	int	<pk,fk>	<i1,i2
DRVR EMPLOYEE ID	char(10)	<pk>	<i1>
DRVR NAME	char(50)		
DRVR EXP DT	datetime		
DRVR TEMPORARILY INACTIVE	char(1)		
DRVR PICTURE REF	char(100)		
DRVR CREAT USER	char(20)		
DRVR CREAT DTTM	datetime		
DRVR MODIF USER	char(20)		
DRVR MODIF DTTM	datetime		

SUBINSTRUCTION			
TK PORT ID	int	<pk,fk2>	<i1,i3
TK ACTR ID	int	<pk,fk2>	<i1,i3
INSTR ID	int	<pk,fk2>	<i1,i3
SUBINSTR ID	int	<pk>	<i1>
FF PORT ID	int	<fk1>	<i2>
FF ACTR ID	int	<fk1>	<i2>
ORDR ID	numeric(9)	<fk1>	<i2>
STDSUBORD LINE NBR	int	<fk1>	<i2>
SUBINSTR NOTE	text		
SUBINSTR STATUS	char(2)		
SUBINSTR CREAT USER	char(20)		
SUBINSTR CREAT DTTM	datetime		
SUBINSTR MODIF USER	char(20)		
SUBINSTR MODIF DTTM	datetime		
SUBINSTR RECORD STAT	char(1)		
SUBINSTR RECORD STAT DT	datetime		

Figure E-6 Model Level Diagram – Page 6